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TITLE OF THESIS/*TITRE DE LA THÈSE* SCENIC ASSESSMENT & LANDSCAPE PROTECTION: The Edmonton-Devon Restricted Development Area

UNIVERSITY/*UNIVERSITÉ* University of Alberta

DEGREE FOR WHICH THESIS WAS PRESENTED/ *GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE* Master of Science

YEAR THIS DEGREE CONFERRED/*ANNÉE D'OBTENTION DE CE GRADE* 1978

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THE UNIVERSITY OF ALBERTA

Scenic Assessment and Landscape Protection: The Edmonton - Devon Restricted Development Area

by

© Robert Alexander Hutchinson

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF SCEINCE

DEPARTMENT OF GEOGRAPHY

EDMONTON, ALBERTA

SPRING, 1978

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Scenic Assessment and Landscape Protection: The Edmonton - Devon Restricted Development Area" submitted by Robert Alexander Hutchinson in partial fulfilment of the requirements for the degree of Master of Science.

Edgar L. Jackson

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Date Nov. 28, 1977

TO ELIANE

Abstract

This thesis employs one variation of a standard technique to determine scenic preferences in the Edmonton-Devon Restricted Development Area (RDA). A semantic differential test was administered to a sample in conjunction with a slide show of representative scenes of the area. The specific parts of the RDA assessed were the undeveloped and the marginally developed areas.

The mean semantic differential score for each photograph was the basis for preference ranking: it was demonstrated that the mean represented the sample's evaluation, rather than an artificial summary of divergent subgroups within the sample. A matrix, with ranked photographs on the y-axis and landscape characteristics on the x-axis, was then used to establish maps of areas of different scenic preference.

The findings indicated that this technique is reasonably successful in enabling the elements of the landscape which are scenically preferred to be located on a map. Areas of high, medium and low scenic preference were located and suggestions as to their future use were made.

The results showed that the RDA can not only be evaluated but future land use recommendations based on this evaluation can be made. No change is required in areas already fully developed (see Fig. 6.1). The remaining area can be divided into three categories, each with its own set of recommendations. First, in areas where scenically preferred landscape dimensions are plentiful, preservation is recommended (see Fig. 6.2)

Second, in areas containing unsightly landscape elements, scenic improvements are encouraged (see Fig. 6.3). Finally, present scenic values can be maintained by identifying areas which require more protection than the present legislation can provide (see Fig. 6.4).

Also included in this thesis are possible directions that future studies may take. The most promising is the inclusion of a model which may aid in predicting scenic preferences. Its hypothesizes that agreement in scenic evaluations is distributed normally around everyday scenes. For example, there would be little disagreement in evaluating beautiful or ugly scenes but increasing disagreement in evaluations as scenes approach ordinary everyday characteristics.

ACKNOWLEDGEMENTS

In obtaining this degree one is metaphorically required to jump through a series of 'hoops' held at varying heights. If one cannot get through, delay is inevitable. I would like to acknowledge and thank those who held the 'hoops' and particularly my friends who helped me through.

Ed Jackson, my supervisor, must receive special acknowledgement, Sheila Brown contributed to the improvement of the final draft, and John England also made useful comments. My thanks must also be expressed to Donna MacLean - proof of her skill as a typist is evident throughout.

This work is dedicated to Eliane, who perhaps more than anyone should be acknowledged and thanked.

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CHAPTER ONE

INTRODUCTION

A. Introduction

a) Scenery and Assessments, Generally

Every landscape has scenery, and although the land is a source of a variety of resources, this thesis focuses on only the visual resource. The concept that a visual or scenic resource exists in the landscape is new, simply because until recently, pleasant locations were plentiful. Scenically, landscapes have suffered change from deteriorating in quality due to neglect, to having been lost completely to unsightly development. To at least partially block this "landscape erosion" (Fines, 1968), assessments and evaluations must be made of the remaining visual resources. Indeed, scenic evaluations are needed more now than ever before so that unanimously preferred land use suggestions, based on some replicable research, can be made. The development of the scenic concept corresponds almost exactly to the growth of ideas about the preservation of wilderness areas. As more of these areas were perceived as being "crowded" with the encroachment of development, there was a greater need to preserve some of the remaining wilderness areas (Lucas, 1964).

Planning has not always neglected scenery. Some particularly spectacular examples where scenery is considered in Alberta are the

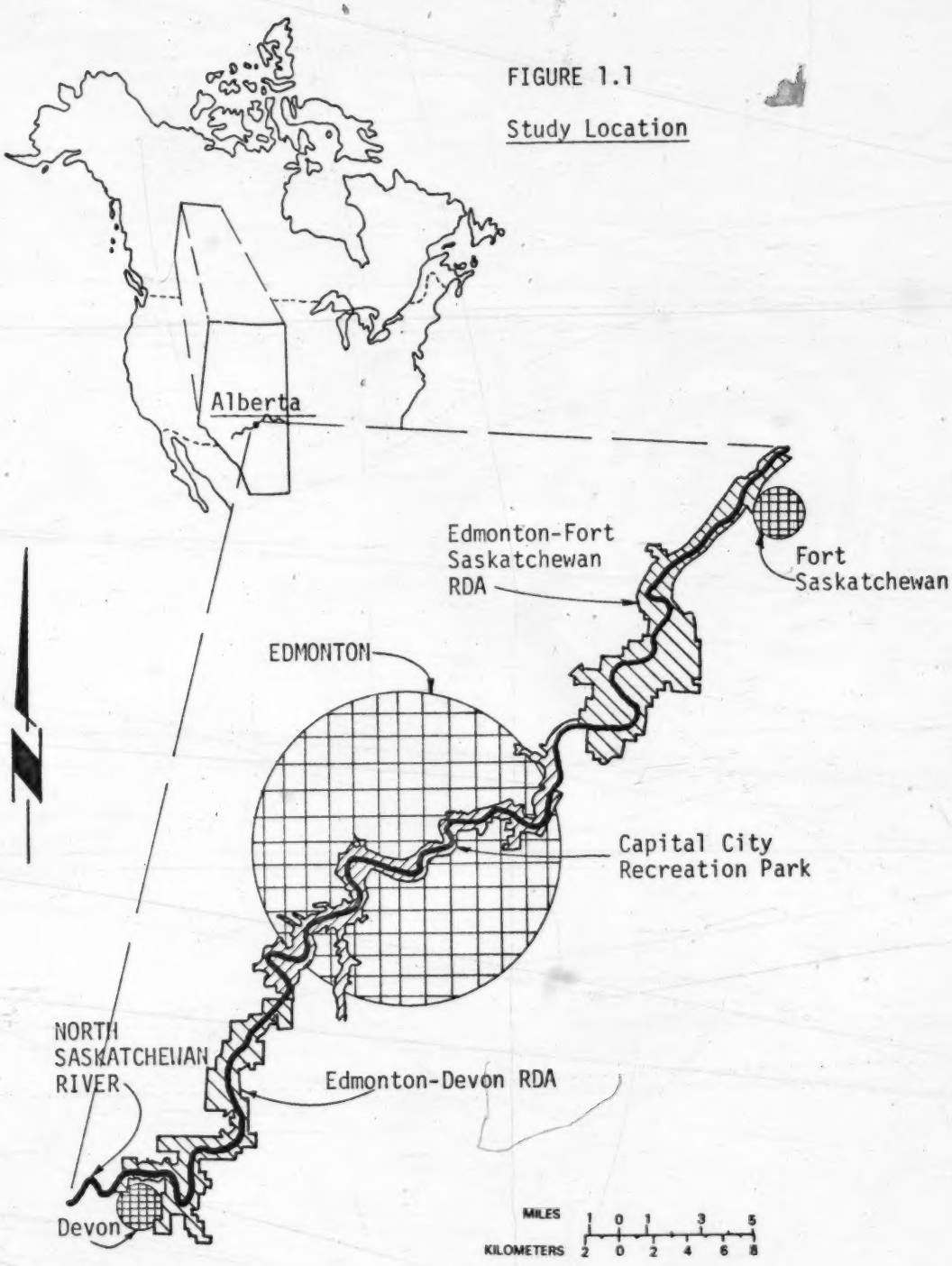
national parks. The visual resources in these parks are of such significance that they are protected for the enjoyment of all. However, much of the everyday scenery is also a resource, albeit less spectacular than the national parks, but still appreciated by many, if only for its contrast to the city. It is in the areas of everyday scenery where landscape erosion is most evident. For example many of the ravines and much of the river valley which once contributed quite significantly to the visual aspects of the city of Edmonton have now been developed, particularly into roadways. If the landscape erosion is to be impeded both upstream and downstream from the city something must be done. A first step has been made by the provincial government by designating the area between Devon (upstream) and Fort Saskatchewan (downstream) a restricted development area (The Edmonton Journal, 4/26/74), (see Figure 1.1).

b) Scenery and Assessments, Specifically

The restricted development area (RDA) that is between Devon and Fort Saskatchewan is divided into three sections: the Edmonton - Devon RDA, the Edmonton - Fort Saskatchewan RDA, and within the city, the Capital City Recreation Park. To date, assessments and evaluations have been done in the Capital City Recreation Park that cover a wide range of interests, specifically environmental variables, for example, the water resource: evaluating the development suitability and the ecological suitability of a planned recreational facility. A scenic evaluation has all but been ignored (Alberta Environment, 1975). Presumably now aesthetics can only be considered last, because almost all other interests

FIGURE 1.1

Study Location



have already been examined. An effort must be made to make the scenic resource a more important part of future feasibility studies.

All criticism cannot be placed directly on local authorities, though, because there are a number of possible reasons, which in part, account for scenic evaluations not being attempted in previous research for the Capital City Recreation Park. First, there is a difficulty in evaluating everyday scenery that is neither spectacular nor ugly. Second, because the scenic evaluation field of research is so new, experts have not been available to perform scenic assessments. Third, testing for scenic preferences in everyday scenes has been both long and tedious, involving different stages of sampling, field trips and often complex analysis. This leads to the final reason for not having scenic evaluations and that is cost - it has for the most part been prohibitively expensive.

The reasons why scenic evaluations must now have a more equitable share of feasibility studies can also be justified. First, it is in the everyday landscapes where changes occur most rapidly and are most noticeable. Pleasing scenes close to an urban area can quickly be lost unless protected. Second, academic concern regarding visual resources in the environment has increased in recent years and evaluation expertise has been developed. Third, this expertise has refined some of the scenic assessment techniques so that final costs are coming into line with other resource evaluations.

An attempt has been made in this thesis to interpret and synthesize the available scenic evaluation data and the procedures of recent years into a model which applies to the Edmonton area and its residents in particular.

B. Scenic Assessment Techniques

The term 'scenic assessment' as used here, refers to the evaluation of an overall culturally defined visual value of part of the total landscape. Until recently, the identity and the importance of this value was based exclusively on the discretion of a researcher, designer or planner. For example, McHarg (1969) pioneered this type of research as part of a landscape assessment of some valleys around the Baltimore area of the United States, and Fines (1968) did original landscape evaluations using views of the East Sussex region of England. Both researcher/planners designated areas that were NOT to be developed because of the high visual quality. However, this type of research has been labeled elitist, and decision-makers now demand a more sophisticated and rigorous justification of these visual values. In response to this demand, researchers now ". . . document their evaluations with references to the literature on qualitative values and to the published findings from landscape perception research" (Zube, et.al., 1975a; 184).

Subsequent research attempted to isolate various landscape elements that elicit certain levels of preference. For instance, natural unpolluted water has been found to almost always get a strong positive score (Zube, 1973). From knowing these various elements, tallying systems could be devised and a similar study applied in different parts of the country, then compared to find a truly general assessment method. Fines, (1968; 45) however, has issued a warning that ". . . the value of a landscape composition is certainly greater than the aggregate value

of its component parts." Therefore it is important to evaluate scenes in total, rank them and compare the rankings of each subgroup to test for consistency in evaluations. Only then are the elements of each scene to be identified.

C. General Purpose of the Thesis

An essential feature of the planning of the Capital City Recreation Park, which is the central section of three restricted development areas, between Devon and Fort Saskatchewan, is the assessment of the landscape resource, focusing primarily on problems related to recreation, water resources and transportation (particularly paths and trails). Visual values have received little direct attention. The general purpose of this thesis is to act as a model so that the scenery might be integrated into a more comprehensive resource assessment process for the remaining RDA's.

This thesis does not attempt to be the definitive scenic evaluation of the whole RDA, but rather attempts to provide an example of a technique whereby an inexpensive, accurate and meaningful evaluation could be performed in the remaining area. To do this a sample population was asked to evaluate scenes of part of the whole RDA. The sample population was a group of university students, and the area was the Edmonton - Devon Restricted Development Area.

The procedure to do this evaluation involves administering a questionnaire to the sample. This is important because decision makers seemingly want

to rely more on social norms than an individual's intuition. It also involves the use of photographic representations of the actual area. Taking a sample to the area to be assessed is too expensive. The analysis is basically simple because complex statistics are often misunderstood by both the researcher and the reader. The final result of this procedure will aid in providing a series of maps, each indicating areas to be scenically preserved, protected or developed. Once this is done, the thesis could be regarded as a model for future studies. In the concluding chapter some suggestions are made as to possible directions future studies may take.

D. Definition of Terms

The definition of terms section is intentionally brief because an effort has been made to obey a principle in aesthetic writing that was introduced years prior to the first scenic evaluations. This principle originated from a procedure of selecting essays which now serve as models for analytical procedures in aesthetics. The criteria used in selecting the essays ". . . included freshness of approach, concern with fundamental linguistic confusions, and freedom from the usual obfuscatory jargon" (Elton, 1959). Therefore a strong attempt is made in this thesis to use as ordinary a language as possible. Also this principle is repeatedly supported by authors concerned with scenic evaluations, for instance, "communication about scenic resources is possible in meaningful terms without resort to a pseudo-professional jargon and without the invocation of an aesthetic elitism" (Zube, 1974; 88); and again when Meinig states

that it is

> not necessary to plunge into the technical thickets of optics, psychology, epistemology, or culture to converse intelligently about the topic. It is far too fascinating and important to be left fragmented and obscured in the jargon of such specialists. It deserves the broad attention that only ordinary language allows. (1976; 47)

To be as concise as possible in this section yet consistent with previous studies, the definition of terms will be taken for the most part from a previous publication - Composite Landscape Assessment (Fabos and Caswell, 1977). This report is concerned with assessment procedures for special resources, hazards and development suitability of a large area around Boston, Massachusetts extending thirty miles (48 km) or more inland from the coast. Any other terms that have a specialized meaning will be defined as they are introduced into the text. There will not be many. Words defined here include:

1) landscape
2) landscape value;
3) landscape assessment;
4) scenic evaluations, and
5) land use.

1) A landscape represents a section of the environment. Meinig (1976) defines it as a stretch of country as seen from a single point. It consists of natural and cultural entities which both affect and are of use to man. There are different types of landscapes depending on the dominant element - farm, rural, metropolitan, et cetera, and this thesis is particularly

interested in the natural landscape as stated earlier, of the Edmonton area. In this type of landscape, human activities, influences and structures are lacking, though not absent.

2) Landscape values are defined by individuals and by groups. When a resource is considered infinite, its value is minimal; however, when it is considered finite, or worse, when it is scarce, the value increases. Landscapes of high scenic quality, particularly everyday scenes of this type are such a resource. When these landscapes were easily accessible from and within the city, their value was minimal, but as development continually destroyed or made access difficult, individuals and groups began to value these settings more.

3) Landscape assessment is the means by which values of the landscape are estimated, evaluated or assessed. The concept is actually analogous to that of property tax assessment. Assessors base property tax appraisals on information and criteria which they in their professional judgment and experience consider validly determine the relative value. In landscape assessment the principle is the same. Assessments of landscape values are based on information and criteria which are strongly thought to be key indicators of relative value. The actual method or steps which are used to make this kind of value assessment of a particular landscape characteristic or set of landscape characteristics is known as a landscape assessment technique.

4) A scenic evaluation is one of many landscape assessment techniques

which are used in composite to give an evaluation that truly approaches an accurate value. Scenic evaluations attempt to assign a meaningful numerical value to a scene. This numerical quantity not only varies from place to place, but is made up of varying values which depend on a number of criteria held by the individual or group. The number is not even 'real' but an indication of the strength with which the value is held by the individual or group.

5) A land use is a unit of the landscape which is characterized by the state or 'use' in which it exists. Any part of the landscape may be identified and described according to its existing use in general or specific terms. For this thesis land use descriptions are general, based on the Canada Land Inventory classification.

E. Organization of the Thesis

The remainder of this thesis is organized into six chapters. Chapter two provides a background for the specific problem by reviewing previous preference studies that are relevant to scenic landscape assessments. Chapter three describes the Edmonton - Devon Restricted Development Area, which for this study is the area to be scenically assessed and therefore is the area from which the views to be analyzed were selected. Consequently chapter three also describes each scene employed in the study. The fourth chapter has two purposes: first, it introduces the research technique by reporting its development from preliminary investigations, that establish the questionnaire design, through a pilot study, which tests and refines

a technique, to the description of the main investigation; and second, describes the sample population. Chapter five considers the data from the main investigation. It is in this chapter that the landscape scenes are first ranked according to the mean scores of the whole sample, and then the rankings of sub-groups are compared to the overall mean scores of the sample to test for consistency of preference. Chapter six clears up the specific problem of this thesis by not only identifying different levels of scenically preferred landscape elements from the ranked photographs, but by locating areas containing these dimensions on a series of RDA maps. The seventh and final chapter summarizes the findings of the thesis and attempts to fit this particular research into a theoretical frame of reference.

CHAPTER TWO

DETERMINING LANDSCAPE PREFERENCES - A REVIEW

A. Introduction

This chapter will provide a background to the specific goal in this thesis which is to compile and supply decision-makers with a series of maps that locate areas of different scenic preference in the RDA. This attempt is a response to the belief that residential expansion into the area surrounding Edmonton has caused needless irreparable damage to the scenery and this loss has not been fully addressed by local planning authorities. If this thesis can demonstrate that the scenery has value, a first step could be taken in establishing scenic resources as part of the decision-making process.

A review of some of the work done in this field will be examined in this chapter. It deals first with the development of techniques for assessing public preferences for the landscape, and second with individual components of these techniques which pertain to a study of this type. For this review, the scope of preference studies to be discussed involved only those which include 'landscape users', that is, anyone who actively and consciously views the landscape, specifically for aesthetics. The scope of the study does not include those who view the landscape for the potential of a particular use, for example, recreation. Techniques

of the second type do not measure landscape quality *per se* (Dunn, 1976).

B. The Development of the Scenic Preference Techniques

a) Introduction - from Professional Judgments to Social Norms

As explained in chapter one, scenic evaluations of the landscape were based almost solely on the "professional judgment" of designers and planners, for example McHarg (1969). However, some "professionals" have overlooked scenic aspects and subsequently visual resources have been lost. Since the visual effects are first noticed in a planned environment, decision-makers (and the public) now demand, and receive more input, particularly into the planning of public lands. The input comes in the form of public hearings but more often in extensive planning studies. Traditionally these studies have relied upon the measurement and definition of a number of factors which "explain" variation in scenic quality, the establishment of measurement scales for such factors, and the development of a weighting system to assign different emphasis to different factors (Dunn, 1974).

These measuring techniques have now evolved into quantitative studies which rely upon statistical analysis to aid in the investigation of the contribution of particular factors to the explanation of visual quality variations. An example of this type of study is the Metropolitan Landscape Planning Model of Massachusetts (Fabos and Caswell, 1977). But the major problem of this evolution has been the movement away from evaluating whole scenes. No matter how exhaustive the set of "relevant" factors is, there

inevitably remains a proportion of variation in landscape quality unexplained by the assembled factors. Preference studies are a product of the disenchantment with these traditional measurement techniques and now ". . . the essence of the preference approach, perhaps, is the judgment of the landscape in totality" (Dunn, 1976).

Preference studies of course still retain many of the characteristics of the traditional studies from which they grew but basically they can be divided into two main groups: those in which landscapes are presented by a surrogate, artist's sketches and models but normally photographic prints or slides, and those in which the 'landscape users' are taken on a field trip to or through the landscape which they are required to evaluate. Because the latter is logistically complicated and often prohibitively expensive research has concentrated on the former.

The remainder of this chapter will therefore discuss the use of photographs, and the techniques used to evaluate those photographs, resulting in a scenic assessment.

b) The Contribution of K.D. Fines

Not only did Fines (1968) pioneer this research in England, he was the earliest researcher to have a sample rank coloured landscape photographs for scenic preference. From this ranking, landscape types and elements were identified so that a region of southern England could be mapped according to a scenic evaluation. He analyzed his results separately for sub-groups arranged according to sex and experience in a

design discipline. Fines assumed that those ". . . with considerable training and experience. . ." would seek and obtain the greatest enjoyment from the landscape. However this assumption has been criticized as being unproven, elitist and unrealistic.

Based on the research of Fines and guided by criticism of it, this thesis also analyzes the results separately for sex, but will consider the respondents' educational experience more widely. The sub-groups that are analyzed include six university faculties in which the respondents were registered, and also the six classes in which they were sampled to see whether differences occur between these sub-groups in scenic preference or whether consistent preferences occur regardless of varied educational experience. In this study consistency of evaluation is desired because without it, preferences based on social norms are lacking.

The result of Fines' study was the production of a scale of landscape values from which he rated seventeen specific landscape types - twelve natural and five urban scenes. But more importantly, it was he who first emphasized having an evaluation of an overall view. In fact, as already mentioned in the introductory chapter, he states ". . . indeed, the value of a landscape composition is certainly greater than the aggregate value of its component parts" (Fines, 1968; 45). As Dunn (1976; 17) points out ". . . this is precisely the factor which (later) measurement techniques find almost impossible to take into account."

From this criticism, this thesis first establishes the overall ranking of each photograph based on the combined scenic evaluation of each

respondent, then identifies the entire combination of landforms and land uses which are represented in the photograph. Segments of the area that are not represented by selected photographs but which have similar combinations of land forms and uses are labeled as being part of the overall scene and subsequently considered to have similar scenic preferences.

c) The Contribution of E.L. Shafer, Jr.

Following Fines the next important contribution to landscape preference studies was by E.L. Shafer, Jr. and his co-workers. Shafer, Hamilton and Schmidt (1968) analyzed landscape preference using black and white photographs. Their aim was to identify ". . . quantitative variables in photographs (which) were significantly related to public preferences. . ." of the landscape. In each photograph the landscape was divided, by using a quarter inch square grid, into zones of water, sky, vegetation and non-vegetation. The variables which described each zone were perimeter, interior area and horizontal end-squares. Three other variables employed were tonal variation of water, land and sky. They then interviewed adult campers in the Eastern United States who were asked to rank from one to five packets of twenty photographs. By using powerful statistical techniques of factor analysis and multiple regression analysis an equation was developed (a preference model) that used six variables which were found to "explain" sixty-six percent of the variation in preference scores for the landscape photographs.

Shafer and Mietz (1970) repeated the technique on adult campers in the Western United States and discovered close similarities to the first

study. Their main point is ". . . that it seems possible to quantify certain aspects of the forest landscape, and furthermore, that our methodology presents a reliable approach" (p.12). The same technique was tested in a Scottish context by Tooby (1970) and again the preference scores were similar (Dunn, 1976; 18).

The studies of landscape preferences developed by Shafer and co-workers have been criticized for two reasons. First Weinstein (1976) is concerned with the problem of validity of the developed model. That is, whether the model indeed measures scenic preference. Weinstein claims that the more complex the statistical problem, the more likely the results of powerful statistics will be misinterpreted or the assumption underlying the statistical model will be violated. Shafer's model was developed with multiple regression analyses and factor analyses.

To test the validity of Shafer's model, Weinstein created a hundred imaginary photographs (the same number as Shafer's original study), and for each, assigned eight attributes (selected from random number tables). The same number of attributes were used in Shafer's studies. The preference score for these imaginary photographs was the rank order in which they were created. Weinstein then analyzed his data by the same method used by Shafer, and repeated the process thirty-five times with entirely different sets of random numbers. From his results he made the claim that ". . . somewhere between one sixth and one half of the variance which appears to be explained by the model is actually due to unreproducible associations between campers' ratings and the measured attributes".

Because of Weinstein's criticism this thesis will not use the preference model of Shafer and co-workers but use instead the descriptive techniques of Fines. That means that photographic characteristics of water, land and sky tonal variations will not be considered. An effort, however, will be made to have these three tonal characteristics as similar as possible between scenes. Also, rather than identify elements from individually ranked scenes, this thesis will consider dimensions of scenes that have been ranked high, medium or low. "It seems most efficacious to limit evaluations to three levels. . ." (Zube, 1973; 372).

The second criticism to come from Shafer's studies regards his use of photographs as measurements of the real environment. This was briefly considered by Weinstein (1976) but more fully criticized by Kreimer (1977). First Kreimer considers Shafer's second set of attributes, tonal variation, and states that this may in fact measure photographic technique rather than being an objective measurement of landscapes; secondly he comments on the "quasi-aerial" photographs used by Shafer (p.92). To overcome these problems Kreimer suggests that the photographs should be pedestrian types of view with time of day, season, contrast and the like controlled. However the use of photographs as a landscape surrogate might best be explained by Coughlin and Goldstein (1970; 12) who write ". . . responses to slides tend to be consistent with responses to the same environment in the field", and that "there is no reason to suppose that ratings of actual environments in the field would be substantially different. . . "(Dunn, 1976). This is also supported by Shafer and Richards (1974) and Daniel and Boster (1976; 48).

Since it is impossible to take large numbers of people around to each landscape, a surrogate must be used. Photographic slides are the most acceptable and convenient substitute. For this thesis an attempt has been made to meet Kreimer's criticisms and the procedure of photograph selection is further explained in chapter three.

d) The Contribution of E.H. Zube

Another study which contributed to the development of landscape preference techniques was by Zube, Anderson and Pitt (1973). It was similar to Shafer's approach but the object was to identify measureable landscape characteristics related to scenic quality, to determine the extent of agreement on scenic quality between respondents (using photographs and field visits) and to examine the relationship between these two factors. Similar studies were repeated by Zube in 1973 and again in 1974. The important contribution of Zube was his method of collecting data to determine the extent of agreement between respondents - he used the semantic differential test, which is employed in this study.

C. Use of the Semantic Differential Test in Landscape Preference Studies

The semantic differential technique was originally developed by Osgood, Suci and Tannenbaum (1957). Essentially, a subject is asked to appraise a given concept, or in this case a photographic scene, and he is given a set of bipolar adjective scales against which to do it. His only task is to pair his appraisal (that is, direction and intensity)

on each scale with the scene. Two adjectives anchor each scale and between them is a continuum on which the respondent indicates preference from favourable through neutral to unfavourable. Preference for a scene is implied if the scale responses are consistently favourable.

The semantic differential is a popular technique because it is applicable to studies of public reactions to many stimuli and because it corresponds to the verbal mode by which individuals frequently evaluate the environment (Brown, 1974; 50). Many researchers have employed variations of this technique in studying environmental assessments. Lowenthal and Riel (1972) for instance, studied four cities of the Eastern United States for six years ascertaining environmental preferences with semantic scales of five steps. Zube's studies of 1973 and 1974, mentioned above, employed adjective scales of seven steps. Brown and Fairbairn (1975; 41) suggest that five step continuums irritate subjects because they are unable to differentiate between positions with ease, and with continuums of more than seven steps, the extra discriminatory positions had much lower frequencies of response. For these reasons, seven step semantic scales will be used in this study.

Zube's study of 1974 using the semantic differential involved both field trips and office studies. He used twenty-five semantic scales to evaluate the landscape. By rank ordering the evaluations he not only found a reasonable level of agreement between groups relating to scenic resources but confirmed the effectiveness of the semantic differential technique. However, in this research and that of others who employed

the semantic differential, obtaining the scales to be used was quite time-consuming. For this reason, only scales that have been used by others were used in this study.

White and Lowenthal have both stated that variations in preferences occur from variations in perceptions, and that attitudes formed by past experiences play an important role in accounting for variations in perceptions (Saarinen, 1976; 156). Lowenthal and Riel (1972) indicate that more accurate preferences can be determined if some experiences can be controlled. For this reason, the sample for this study almost totally consists of third and fourth year university students.

The studies noted above have used the semantic differential as a technique to determine scenic preferences. They have done so by rank ordering a sample evaluation of an actual landscape, as seen on a field trip, or more often, landscape surrogates, usually photographic. This study determines the scenic preferences of a sample by rank ordering their evaluation of ten scenes shown in a slide presentation. The evaluation is determined by calculating the mean scores of eleven semantic scales for each scene.

D. Specific Goal of the Thesis

The specific goal of this thesis is to provide decision-makers with a series of maps - each of which locates an area of different scenic preference in the RDA. To do this, a number of photographic landscape

scenes will be evaluated by using the semantic differential technique. Once the scene is evaluated, its order according to rank can be determined giving its particular preference. In this case three distinct levels of evaluation will be made - high, medium and low. From the ranked scenes, landscape dimensions will be identified which together differ from each evaluation. When this is complete, scenic areas in the RDA can be located and suggestions can be made as to which land uses should or should not be allowed.

The studies reviewed here suggest that the semantic differential is an effective and efficient way to evaluate photographic slides. The researchers have shown that if proper consideration is demonstrated in taking photographs, they are an acceptable surrogate for the real landscape.

To analyze the data gathered by the semantic differential, sub-groups are chosen and then compared. Sex, chosen field of education and the amount of reading each respondent claims to do will be the sub-groups for this study. Consistency of evaluation will be looked for in the evaluations.

One final problem that arises in semantic differential tests is their length. A long test can create boredom in the respondent and in a short test, accuracy is questioned. Therefore a simple ranking technique will be tested as a surrogate for the semantic differential applied in this study to see how accurate it might be in evaluating photographic slides.

CHAPTER THREE

STUDY AREA AND PHOTOGRAPH DESCRIPTION

A. Introduction

The Edmonton - Devon Restricted Development Area (RDA) of Alberta is the locality from which the physical environmental settings to be analyzed were selected. This area was convenient to study, representative of much of the river valley in the Edmonton district, and has been preserved from development since October, 1974. The total area is approximately 8420 acres (2407.3 hectares). The Area was established by the Government of Alberta and is adjacent to and in part contained within the metropolitan boundaries of the City of Edmonton (see Figure 3.1). With such close proximity to the city, the development potential is great, particularly for housing, recreation and transportation. This possibly suggests that the pressure placed on the government to develop or to allow development would also be great.

There are four reasons given by the Government of Alberta for establishing this area:

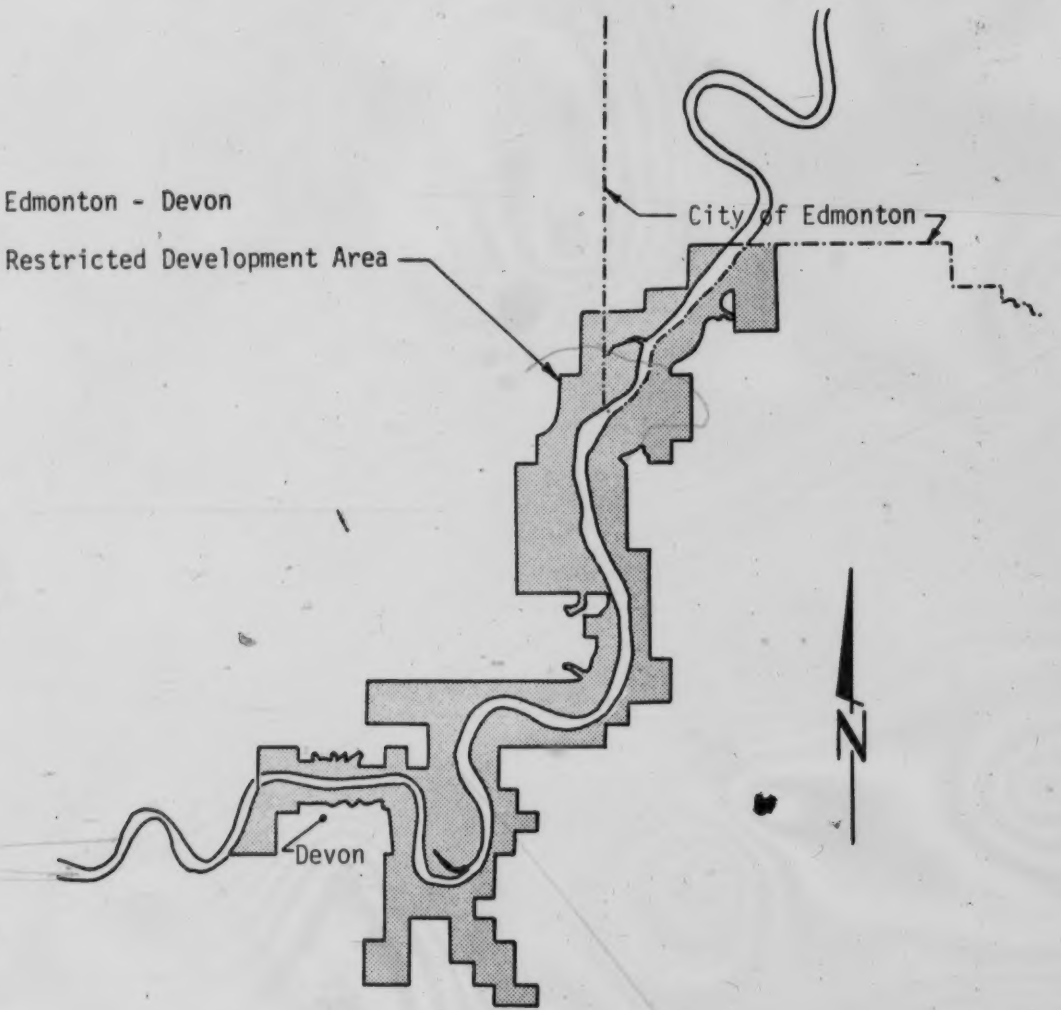
1) preventing, controlling, alleviating or stopping the destruction, damage or pollution of the natural resources in the Area;

2) protecting the watershed in the Area;

3) retaining the environment of parts of the Area in a natural state suitable for recreation or the propagation of plant or animal life;

FIGURE 3.1

Location Map



Scale: 0 2 4 6 Miles
0 2 4 6 8 10 Kilometers

Source: Alberta Environment, Land Assembly Division

4) preventing the deterioration of the quality of the environment of the Area by reason of the development or use of land in the Area incompatible with the preservation of the Environment (Alberta Regulation 286/74; Department of the Environment Act [O.C. 1771/74; 1974]).

The regulations as to what can and cannot happen in the Area are quite specific. For instance, no representative of the government shall, without written consent of the Minister of the Environment, order, authorize, approve, permit, or consent to:

1) any operation or activity that causes, is likely to cause or will cause a surface disturbance of any land in the Area;

2) seismic operations;

3) gravimetric operations;

4) magnetic operations;

5) geochemical operations;

6) test drilling...etc. (Alberta Regulation 286/74).

B. Physiography

From Bayrock and Hughes' (1962) study of the surficial geology of the Edmonton district, three distinct physiographic units may be identified in the RDA (see Figure 3.2):

1) North Saskatchewan River Valley;

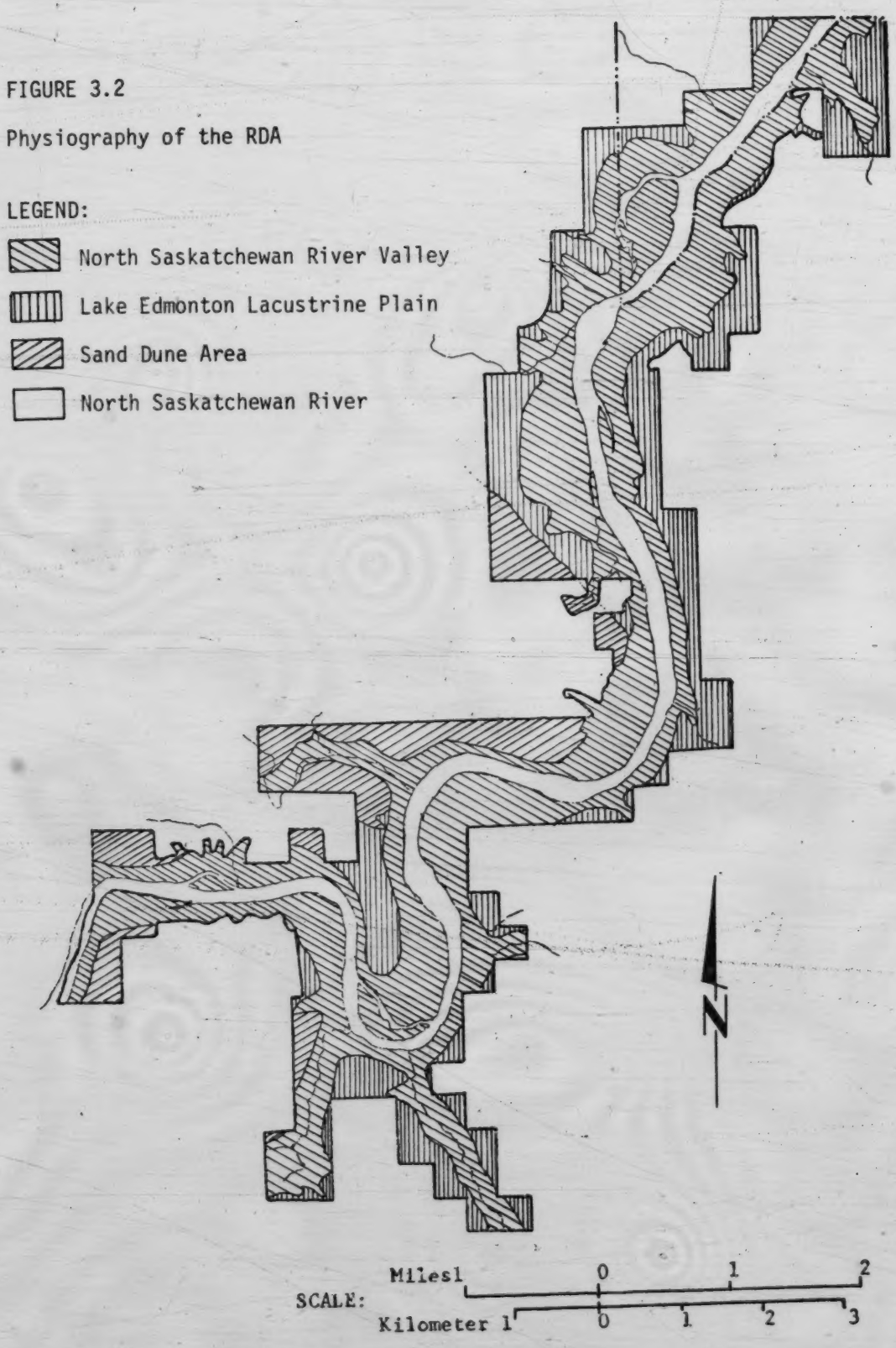
2) Lake Edmonton Area;

3) Dune Area.

The North Saskatchewan River Valley is the main drainage channel of the

FIGURE 3.2

Physiography of the RDA



Area and the largest of the three physiographic units of the RDA. It flows from southwest to northeast through the RDA and continues its northeasterly flow through the City of Edmonton. The valley seldom exceeds one mile (1.6 km) in width at the top. On the average the walls are about two hundred feet (60 m) high and in places form very steep cliffs.

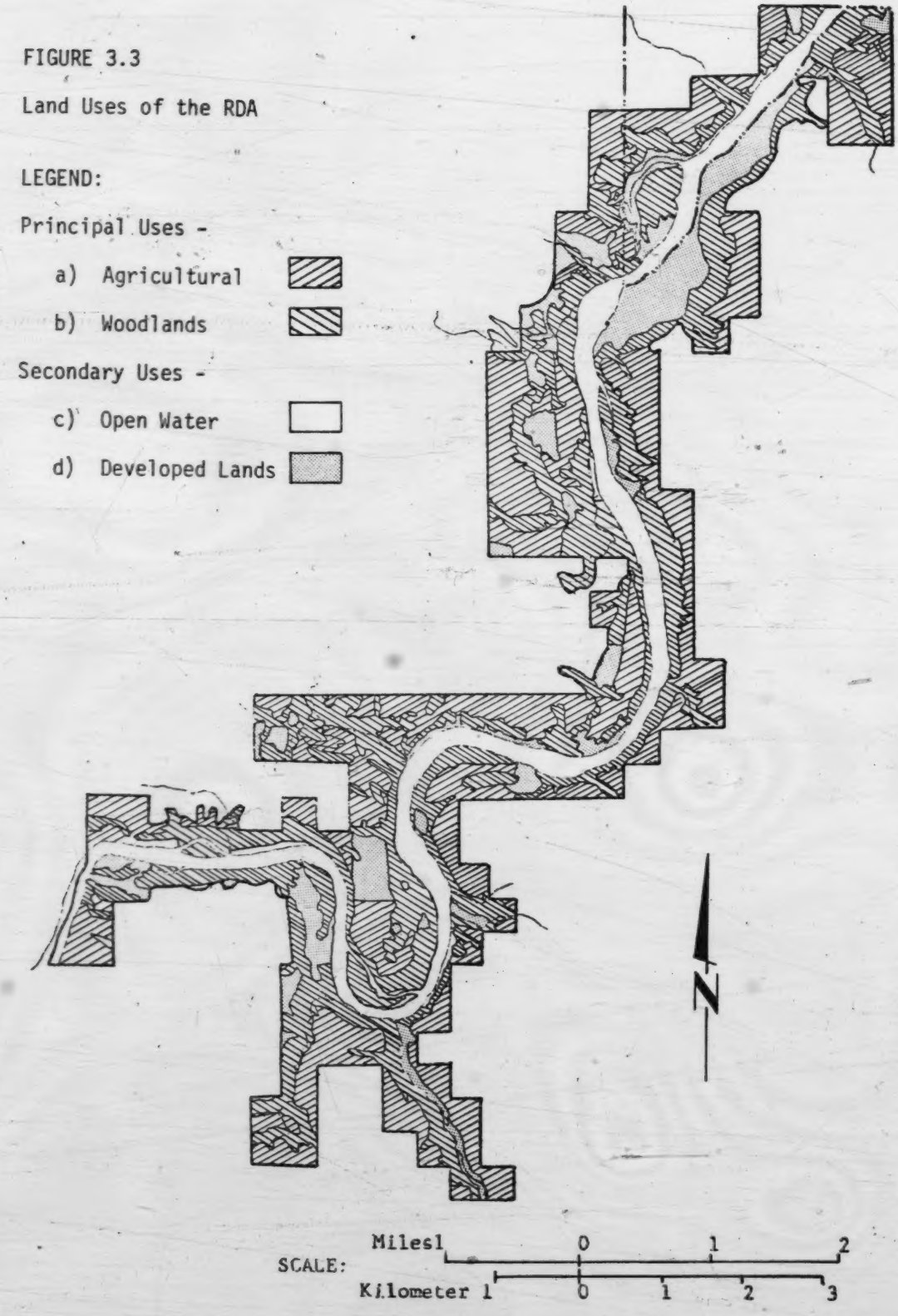
The other two physiographic units comprise only a small part of the RDA. The Lake Edmonton Area is the next largest unit and gets its name from Glacial Lake Edmonton. This area is a lacustrine plain and topographically is smooth throughout most of its extent. A dune area is found on the western edge of the RDA but extends from there about ten miles (16 km) west, and six miles (9.6 km) north of the river. The sand dunes are more closely spaced adjacent to the RDA than they are further to the west. A swampy terrain occupies the inter-dune area. Few dunes exceed forty feet (12 m) in height and only smaller ones exist within the boundaries of the RDA. Only longitudinal dunes exist within the RDA, some of which attain a length of over two miles (3.2 km).

C. Land Uses of the RDA

For this study the Area was divided into four land use categories (see Figure 3.3). Two principal uses are: (a) agricultural or open land, and (b) woodlands; and two secondary categories are: (c) open water, and (d) developed lands. To some extent each of these uses is related to the topography - particularly slope.

FIGURE 3.3

Land Uses of the RDA



Agricultural land is taken up by crops which are present on reasonably flat terrain with slight drainage, or pastures which occupy steeper slopes or low areas that are prone to ponding. These areas are generally outside the river valley but there is some pastureland on a few of the slip-off slopes of the river.

Forested or wooded lands occupy all the slopes cut by natural erosion where agricultural machinery cannot operate and where clear cutting would lead to harmful erosion. The few islands that have stabilized over the years are also woodlands and have natural stands of aspen and balsam poplar.

The two secondary land uses are open water and developed land. Open water of the RDA is the North Saskatchewan River which is approximately fourteen percent of the total area (surface area ≈ 1127 acres). Developed lands have two classifications:

1) extractive resource development such as gravel pits or oil and gas extraction;

2) other development such as residential or recreational uses, such as golf courses.

D. Selection of Photographic Slides

When representative photographs are needed of landscape scenes of an area, personal bias almost unavoidably complicates the selection, so that a truly representative sample would be difficult to obtain. In an

attempt to overcome this inherent problem an extensive study of the area was completed before actually visiting the site. This was done with maps and large scale panchromatic aerial photographs (approximate scale 1:1000). Initial consideration was given to such information as spatial relations, particularly between the physiographic units and the RDA itself, slopes, access routes, drainage patterns and vegetation cover, after which land uses were considered.

A land use map dated 1965 was also studied but proved to be obsolete for at least a quarter of the Area. Therefore a present (October, 1975) land use map was drawn with the aid of the aerial photographs mentioned above. Because the RDA was established in October, 1974, these photographs provided accurate information of actual uses. By combining this land use map and the RDA information from sections B and C enough information was provided to divide the area into typical units:

1) River and Valley
    a) Undercuts
        (i) Wooded
        (ii) Steep Cliffs
    b) Slip-off Slopes
        (i) Wooded
        (ii) Agricultural
        (iii) Other Development
            (a) Recreational
            (b) Mineral Extraction

c) Tributary Valleys

(i) Wooded

(a) Eroded Floor - young

(b) Without Erosion - old

2) Plain and Dune Area

a) Wooded

b) Agricultural

c) Residential

At this point a decision was made to exclude areas already developed.

The next step was to visit the RDA armed with this information to take scenery photographs of the landscape in each of the typical units. This involved many trips because a complete circuit of the area took at least seven hours, involving a drive of over a hundred miles. To keep lighting and 'atmospheric conditions' (for example, extraneous features - sunsets, et cetera) constant, photographs were only taken during the six hours between 9:00 a.m. and 3:00 p.m. on days which were bright and calm. All photograph-taking trips were made in June, 1976.

Fifty representative photographs were chosen and critically analyzed by ten graduate students as to photograph quality, clarity and subject prominence. From their analysis, thirty photographs, considered the poorest, were discarded. The remaining twenty are described by the matrix - Table 3.1. These twenty photographic slides were used in a pilot study.

To break down the data from the pilot in which a seven step semantic

TABLE 3.1

PHOTOGRAPH DESCRIPTION BEFORE PILOT

PHOTOGRAPH NUMBER	PHYSIOGRAPHY								LAND USES								VIEWER POSITION	
	River & Valley						Plain	Dunes	Natural				Agricultural		Development			
	Sides		Banks		Ravine				Water		Trees							
	Slip-off Slope	Cut Banks	Steep	Gentle	Trees	Few Trees			Present	Absent	Present	Sparse	Pasture	Crops	Exploitive	Recreation	Superior	Normal
1	X									X		X				X		X
2		X	X						X			X						X
3					X					X	X				X		X	
4			X							X	X		X		X			X
5	X	X	X	X					X		X		X				X	
6								X		X		X	X					X
7				X					X		X							X
8					X					X	X							X
9								X		X		X		X			X	
10	X			X					X		X				X	X	X	
11	X	X	X						X		X			X			X	
12							X			X		X	X					X
13							X			X		X		X				X
14					X					X	X							X
15					X					X	X							X
16				X			X			X	X		X		X		X	
17			X		X		X		X		X						X	
18			X							X		X	X					X
19	X									X		X			X			X
20	X			X					X		X							X

differential was used to evaluate the photographs, scale values for each photograph were totaled so that the calculated average could act as an evaluation. Seven possible evaluations were therefore identified into which the twenty photographs were grouped. These seven possibilities were then stratified into three categories - like, dislike and indifferent. Stratification was performed so that a proportional number of slides (in this case half) could be chosen from each strata in order to have a final photograph selection of ten slides.

Since the Area consists primarily of a river valley incised into a lacustrine plain, seven of the photographic slides depict riverscapes or enclosed ravines. Two scenes show the principal land uses - agricultural and woodlands, and one scene represents the developed recreational facilities - a golf course and fairway (see Figure 3.4 which is a map of photo location and associated vista).

E. Photograph Description in Order of Presentation to the Respondents

The scenes were shown to the respondents in the form of 35 mm color slides projected on to a screen. The black and white photographs used in this thesis are intended only as a representation.

Photograph one is the scene of the golf green and fairway. The foreground is green, the middleground of the slide is the fairway and the background shows the heavily wooded river banks. Incidental features in this photograph are a few clouds and distinct sharp shadows.

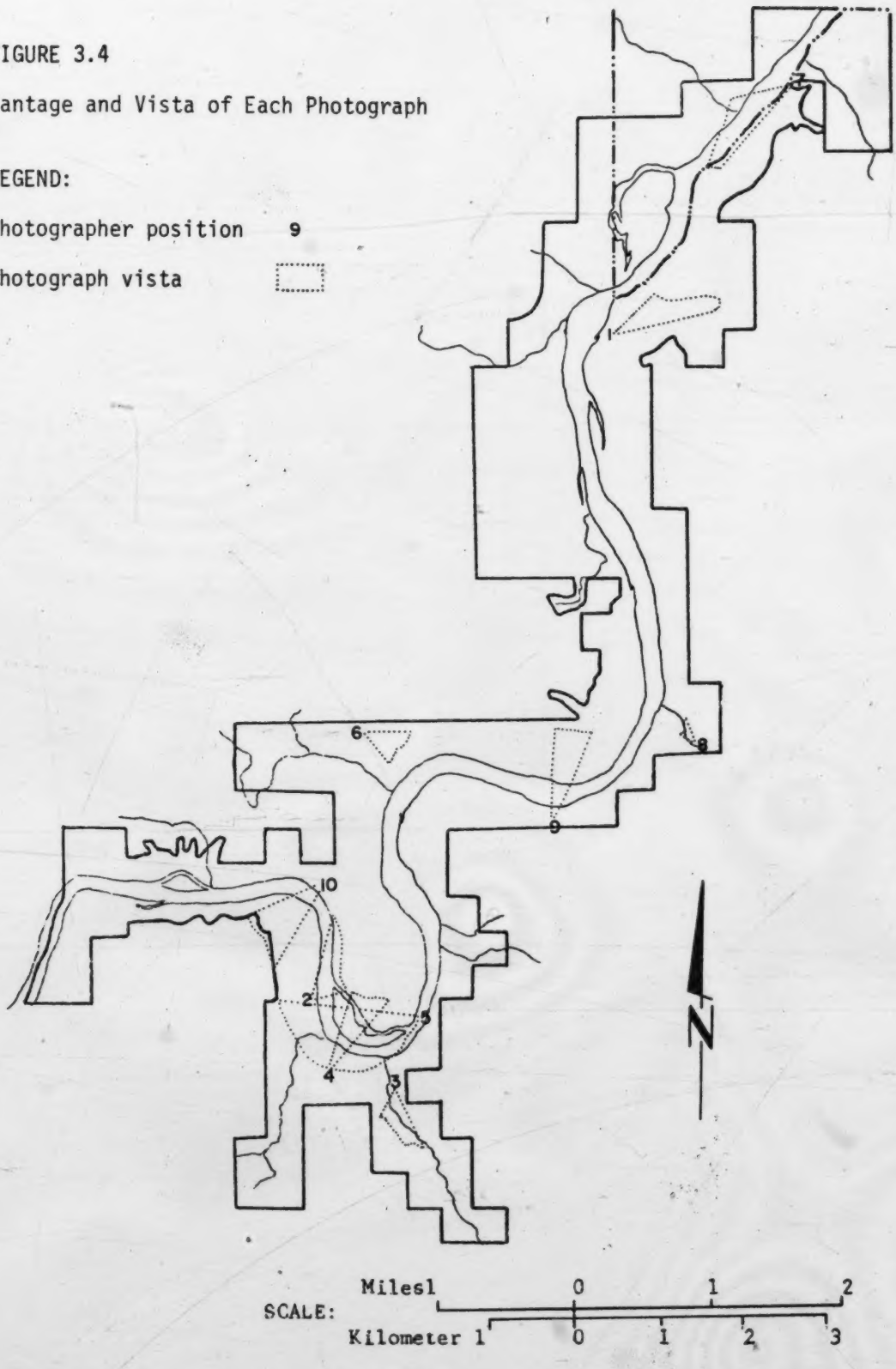
FIGURE 3.4

Vantage and Vista of Each Photograph

LEGEND:

Photographer position 9

Photograph vista



PHOTOGRAPHIC SLIDE NUMBER ONE

PHOTOGRAPHIC SLIDE NUMBER TWO

Photograph two has two main features. Water is the predominant feature in the foreground and the background emphasizes some of the typical sheer bentonite cliffs. Two chance features in this slide are the hazy sky and the almost perfect reflection of the cliffs in the river.

Photograph three features an enclosed ravine and is heavily treed. There is, however, evidence of man, in the form of a pipeline clearing on the right side of the middleground. This ravine has a north-south orientation. The scene also has a slightly hazy sky but the shadows are crisp.

Photograph four illustrates the intermediate relief of the river banks - between the steep cliffs of the undercuts depicted in photograph two and the gentle slip-off slopes. The sky is clear and the presence of man is seen in the form of a shed and road.

Photograph five is a panoramic view of the river and valley. There are sharp shadows and very few clouds. The observer is 'superior', that is, above the scene such that maximum variance in landuse diversity is seen. Actually the observer is approximately two hundred and fifteen feet (70m) above the water surface. There is evidence of man (a road and buildings), but only in a small part of the whole scene.

Photograph six has rolling grassy hills in the background. These hills are actually sand dunes which were once heavily wooded and have now been partially cleared into a pasture. The foreground and middleground show pasture. Evidence of man is in the form of saplings planted mid-way in the scene. There are a large number of clouds and very little relief.

PHOTOGRAPHIC SLIDE NUMBER THREE

PHOTOGRAPHIC SLIDE NUMBER FOUR

PHOTOGRAPHIC SLIDE NUMBER FIVE

PHOTOGRAPHIC SLIDE NUMBER SIX

The prevalent feature of slide number seven is the river. The foreground is mainly water with some mud flats, the middleground is all water and the background shows the well treed river banks of either side. The sky is clear and the only evidence of man is a boat on the river.

Photograph eight is another ravine. Like photograph three it is heavily treed but much more enclosed. This ravine is oriented east-west. Water erosion is quite evident and the foreground is grass. Evidence of man is in the form of two barely perceptible power lines at the top of the scene. The power lines can be seen on the slide presentation.

Frequently as the observer travels along the edge of the valley, he can see, through the trees, a view of the opposite side. Photograph nine represents such a view. Trees in the foreground frame the rolling cropland in the background. The middleground is the woodlands of the river bank (although no water can be seen). In the center of the field is a small weathered building and beyond that, trees make up the horizon.

Photograph ten is another scene across the river. The foreground in this shot depicts trees, shrubs and the river. Beyond that in the middleground is a wooded slip-off slope which has been cleared in places for a golf course. In the background are the wooded river valley sides (common throughout the RDA), and residences in the town of Devon. An

PHOTOGRAPHIC SLIDE NUMBER SEVEN

PHOTOGRAPHIC SLIDE NUMBER EIGHT

PHOTOGRAPHIC SLIDE NUMBER NINE

PHOTOGRAPHIC SLIDE NUMBER TEN

incidental feature to the right of the background in this scene is a plume of smoke from what might be an oil flare pit.

F. Discussion

Each of the photographs described above depicts several landscape characteristics or dimensions in differing amounts. Some researchers who have already been cited, particularly Zube (1973) have been able to isolate and identify a few of these landscape characteristics. They have found that these characteristics correspond with high scenic value, and it is useful here to discuss the ten representative scenes of this study in those terms.

Zube's (1973) study results suggested that rural regional scenic values are a function of landform (relative relief), land use diversity and degree of naturalism - all influenced by the presence of a specific landscape feature, water. A matrix (Table 3.2) shows the varied amounts of these features in each of the ten photographs.

A pair of illustrative examples serve to explain this matrix. For instance, photographs displaying a number of different landforms would have a slightly higher order of relative relief than those with only one landform. Both photographs five and seven display three landforms; both have large amounts of trees and water and both have few influences of man evident. Therefore they also have a high degree of naturalism. Each of these dimensions are noted on the matrix. On the other hand photograph

TABLE 3.2

Matrix of Varying Amounts of Landscape Characteristics Present in Each Photograph

Photograph Number	LAND FORM							LAND USE DIVERSITY													DEGREE OF NATURALISM									
	increasing steepness →							Varying amounts of primary and secondary land uses in percentages of scene													Totally Natural	decreasing naturalism →								Totally Man-made
								A Trees				B Water				C Agric'l				D Devel't										
	Slip-off Slopes	Undulating Hills	Sand Dune L'scape	Mature Ravine	Young Ravine	River Valley	Rugged Cliffs	76-100%	51-75%	26-50%	0-25%	76-100%	51-75%	26-50%	0-25%	76-100%	51-75%	26-50%	0-25%	76-100%	51-75%	26-50%	0-25%	10	9	8	7	6	5	4	3	2	1
1	x	x									x				x				x	x										x		
2							x				x		x						x				x		x							
3				x				x							x				x				x			x						
4						x	x		x						x			x					x						x			
5	x	x				x			x				x						x				x		x							
6			x								x				x	x					x									x		
7	x	x				x				x		x							x				x		x							
8					x			x							x				x				x			x						
9		x				x		x							x			x					x			x						
10	x	x				x			x					x					x			x						x				

six has only one landform, few trees, no water and one prominent land use - agriculture. The degree of naturalism subsequently is low since much of the scene is man-made.

The other photographs with only one landform are two, three and eight. These three photographs also have similar degrees of naturalism and one dominant land use. Therefore one might expect to have these three photographs in later analysis ranked together. Because of the presence of water in photograph two, this photograph might be expected to be ranked more favourably than the other two.

G. Conclusion

This chapter has described the physical characteristics of the RDA and has visually illustrated this description with ten photographs. Figure 3.4 indicates the vantage point of each photograph and its vista. It is obvious from this that less than ten percent of the RDA is used to represent the Area. But because there are only two major land uses plus the river, and only three major physiographic units, it is assumed that after careful selection, ten photographs can adequately represent the undeveloped and marginally developed areas of the RDA.

CHAPTER FOUR

METHOD AND SAMPLE

A. Introduction

As outlined in the discussion of the specific problem of this study, the overall task has been to gather information pertaining to scenic preferences associated with the natural landscape of the RDA, and to identify and locate dimensions of these scenes on a map of the Area in such a way that scenic land-use suggestions can be made.

Past experiences affect perceptions and in turn affect preferences (Saarinen, 1976). Some of these experiences, and therefore preferences vary with age and sex differences, levels of education attained or even the amount of reading one does, and it is these differences that will be considered in this chapter. The initial task therefore will be to consider a sample population with a common background - one in which some of these differences are minimal. This was accomplished by sampling third and fourth year university students. Thus age and level of education attained are similar. Since many researchers doubt that professional biases are non-existent a careful selection of the disciplines sampled was also noted.

Scenic preference data were collected from a sample of students by a questionnaire survey. The purpose of this chapter is to discuss how the questionnaire was administered, to explain the questionnaire itself, and

to describe the make-up of the sample.

B. Procedure

a) Preliminary Work

Prior to the main investigation, as previously explained in chapter two, fifty photographic slides of landscape scenery were viewed by a group (ten) of geography graduate students. These were colour slides of natural scenery of the RDA including woodlands, pasture, cropland, ravines, built-up and recreational areas. Each person was asked to rank the scenes by photographic quality. These accounts helped to choose twenty scenes which were acceptable as similar in quality, representative of much of the RDA and suitable for a pilot study.

In another preliminary investigation, a different group of geography students were asked to complete a rough draft of a questionnaire. This was completed at their leisure and each person was asked to indicate the elapsed time it took to complete the test, and whether questions were ambiguous, hard to understand or difficult to answer. From these accounts twenty-nine questions were accepted as suitable for a pilot study.

In the pilot study the semantic differential procedure was used to determine the attitudes towards the photographic slides and it was combined with the twenty-nine questions which solicited background information. (The semantic differential will be more fully explained later in this chapter.) The pilot test was administered to two undergraduate geography

classes in the summer of 1976 during which the students were asked to rate each of the above twenty scenes on thirty different semantic scales.

This part of the preliminary investigation indicated that it would be necessary to reduce the number of scales and the number of scenes so that the subjects' task could be completed with ease and without boredom affecting the results. This was done by selecting scenes so as to provide as wide a range of semantic differential ratings as possible yet remain representative of the RDA, and by eliminating scales which appeared to represent essential duplications of other scales. For example, "complex-simple", which was dropped, had a similar response as "varied-monotonous". This was based on a procedure developed by Calvin, et.al. (1972). The pilot also enabled some of the questions to be reconsidered, revised or completely dropped. For instance, the students' identification number question was dropped because it did not contribute any needed information, as well as a question regarding ethnic origins, which was poorly answered. In addition the format was changed to allow the semantic differential to be answered a quarter of the way through the answering of the questionnaire. This added a little variety to the respondents' task and was designed to lessen boredom.

b) The Main Investigation

From the many classes offered to third and fourth year university students at The University of Alberta, six were selected for this test. These students were used in an attempt to minimize level-of-education differences. It was felt that at this level of competence most faculties are much the same in educational standards. To be as consistent as

possible, the main investigation was administered between October fifth and fourteenth, 1976.

As sample selection proceeded, an effort was made to have an otherwise homogenous group of university students approximate the 'real world'. Extreme differences in scenic preferences probably exist in the real world, therefore classes which are generally believed to be at different positions on an 'aesthetic continuum' were chosen. Engineering students from a highway design course were selected as an example of an intensely technical training. This group was not completely ignorant of aesthetics, because they have had some cursory consideration regarding scenic awareness in route design. Art and Design students taking industrial design were chosen for their aesthetic background. If differences were to occur between groups in the analysis, it was felt that the occurrence would be between these two groups. Forestry/Agriculture students enrolled in Wildland Recreational Management were selected because many of the scenic preference studies by foresters have been done in environments similar to that of the RDA. It was believed that if a professional bias was present, these students would exhibit it, having enrolled in a four hundred level course. Recreation students from the class "Introduction to Recreation Research" were selected for their familiarity with questionnaire and sampling techniques. Like foresters, recreational researchers have also been active in the field of scenic assessments. Students from two geography classes (Resource Conservation and Mountain Geomorphology) were selected as classes with a somewhat more general education. Resource Conservation

students represented a social science background and Mountain Geomorphology students a physical science background. Also in these two classes there existed a wider range of faculty enrollment. As well, students ranged from undergraduates through honours to graduate studies with both full time and part time students. In summary the subjects were selected so that the individuals had minimal educational differences, were not all trained in environmental issues *per se* but were not completely ignorant of aesthetic considerations in the environment either. The six classes tested are listed in Table 4.1

TABLE 4.1
Sample Composition

Class Description	Department	Course Number	n	%
Mountain Geomorphology	Geography	438	49	27.68
Industrial Design	Art & Design	474	13	7.34
Resource Conservation	Geography	424	26	14.69
Highway Engineering	Civil Engineering	510	59	33.33
Wildland Recreational Management	Forest Science	462	16	9.04
Intro. to Recreation Research	Recreation	477	14	7.92
		TOTAL	177	100.0%

Before each class was tested, cooperation of the instructor was obtained. This was gained quite easily when they were informed of the precise twenty minute running time of the questionnaire. Their cooperation reduced

the problem of seeking volunteers from the total population of students and in case any respondent hoped to gain approval of the staff by doing the test, each class was informed that participation was completely voluntary and did not in any way contribute to their grade.

The testing procedure was such that before the class started the slide projector was set up so that the images on the screen were similar in size for each test. Then the class period started with each member being given a copy of the questionnaire. While this was proceeding they were informed that after five minutes had elapsed the lights would be dimmed and a slide presentation would proceed. This was enough time for the subject to answer the first part of the questionnaire (see Appendix A) and read the instructions to the semantic differential adopted from those customarily used (Osgood, et.al., 1957). At the appointed time the lights were dimmed and each of the ten slides were shown for one minute, during which the subjects completed the eleven scale semantic differential. After ten minutes the respondents were asked to complete the questionnaire in the remaining five minutes. During this time the projector and slides were put aw[illegible]d the finished questionnaires were collected. The eleven scales are listed in Table 4.2.

C. Questionnaire

a) Type of Questions

Half of the questions in the revised questionnaire are open-ended, the other half pre-coded. Pre-coding is convenient but was found to be

TABLE 4.2

Adjective Scales in Sequence of Analysis

Scale in Sequence	"Letter-name"
like - dislike	A
natural - artificial	B
beautiful - ugly	C
pleasant - unpleasant	D
varied - monotonous	E
alive - lifeless	F
usual - unusual	G
valuable - worthless	H
interesting - boring	J
stimulating - unstimulating	K
high scenic value - low scenic value	L

limiting for the students of the pilot study, which was three-quarters pre-coded. It was felt that with some revisions to the pilot questionnaire, coding an open-ended questionnaire would be worth the effort.

b) Education Questions and Reading Habits

In the questionnaire, the first five questions relate to the respondent's education. Since education is an important aspect of this study, and since students normally have no hesitation in answering these types

of questions, the placement allowed a quick start for the subjects. Questions one to three elicit information regarding the respondent's university training; four and five refer to any other training. Question thirteen solicits information about the subject's reading habits, asking not only the type of material read, but the frequency with which the different materials are read. It was assumed that to have reached the level of competence of third and fourth year university, the reading of different material would be a matter of course. Since this was assumed (that most of the sample would read different material), the amount of different material read was considered to be more important than the type of material read.

c) Explanation of Reading Habits

In the analysis the term 'average reader' will be used and pertains only to the sample since these students probably read more than average for the whole population. Reading amount is a subjective assessment and is divided into three: above average readers read three different types of material daily and any other three types at least monthly; below average readers read at least one type monthly, but do not read three types at all; average readers, who constitute the majority of the sample (approximately sixty-two percent) read any other combination of types and amounts that falls between these two extremes.

D. Dependent Variable

Chapter two designated the dependent variable to be the ranking of ten

representative photographs of the Edmonton - Devon RDA. To determine a score for each photograph so that a ranking can be made, the mean of the total evaluation of eleven seven-step semantic scales was calculated. The analysis of the semantic differential is explained in chapter five. This chapter explains the procedure used in developing a semantic differential test for this study and lists the final selection of terms.

In an earlier section it was explained that preliminary investigations were completed before either the pilot study of July, 1976 or the final investigation of October, 1976. This same procedure was followed for photograph (chapter three) and question selection, as well as the semantic differential design. The preliminary investigation in this case was the selection of a set of bi-polar adjectives for the pilot. Ideally there would be enough pairs to be as representative as possible of all the ways in which meaningful judgments can vary, and yet be small enough in size to be efficient in practice. Ordinarily a new set of adjective pairs are generated for each new study; however, for this study a set of fifty-four pairs was put together from previous preference studies which have used the semantic differential procedure. This avoided unnecessary duplication of the efforts of these previous researchers and conserved much valuable time.

The next step involved taking the fifty-four pairs and subdividing them into groups that have been used in previous studies three or more times, twice or once. From this division the selection of a pilot set was established. All the adjective pairs appearing in three or more previous

tests were retained, seven pairs of the eleven used twice remained and eighteen of the remainder were kept. The basis for retaining particular pairs depended on whether the pair related in some way to relative relief of the land, water, naturalism, or land use diversity. Pairs which in no way related, for example, "sad-happy", were rejected. The thirty pairs were then employed in the pilot.

The final selection of a set of bi-polar adjectives for the main investigation resulted from analyzing the pilot test and considering Craik's landscape adjective checklist endorsement rate (1975; 138). Craik had already established a list of adjectives that were familiar to people and used often in describing the landscape. Therefore those pairs of adjectives which were both considered familiar by Craik and were identifiably positive or negative from the pilot were employed in the main investigation. Eleven pairs were used in the main investigation and since these adjective scales are repeatedly used for each of ten evaluations, scale sequence for each photograph was randomized by using random number tables before administering the questionnaire to the students. Scale polarity also alternated for different photographs. This randomness was then organized before analysis so that scoring the photographs would be an easier task. This was done by assigning each scale a "letter-name" and polarizing them with positive terms first. The organization sequence of adjective pairs is given in Table 4.2.

E. Independent Variables

Past research in this field has shown that the ranking of photographs, determined from the total sample's mean semantic differential scores, can best be analyzed by comparing similarly derived photograph rankings of various subgroups. That is, the overall photograph ranking depends on the photograph ranking of constituent (integral) subgroups. The independent variables were as follows, based on previous research: Fines (1968) divided his sample by sex and had an idea that education in particular fields would cause variations in preferences; Craik (1975) thought the amount of reading, particularly magazines, would influence preference and Laurie (1975; 106) suggests that those trained in making aesthetic assessments may have different preferences. In this study there are four subgroups: sex, amount of reading, faculty enrollment of respondent and class the respondent was tested in. Each of these subgroups are explained below.

a) Sex

The distribution of sexes in the sample was approximately three to one with 75.7% males and 24.3% females. This is different from the normal population and is caused by the almost total male population of engineers. This lack of uniformity might be corrected in future studies by adding a female dominated class, perhaps from home economics, or by excluding engineers.

b) Amount of Reading

As previously stated, it was suggested by Craik and assumed here that reading habits would have an influence on one's scenic preferences. More

than ninety percent of the sample read school material, newspapers and magazines at least monthly and many read the first two daily, but only half the sample read short stories, novels or non-fiction books equally as frequently. More than a third of the other half did not read this material at all. Therefore based on this information, a subjective assessment for this study of an average reader was made. This classification has been discussed previously in this chapter. Thirteen percent of the sample were above average readers, sixty-two percent average and twenty-five percent below average.

c) Faculty

Five faculties were analyzed plus one group of 'others'. This last group was 6.2% of the sample and is made up of a number of faculties and staff that are too small in number to be considered alone. It includes graduate studies, education, academic and non-academic staff and non-responses.

Civil Engineering (33.3% of the total sample) students are all from one class, Highway Engineering (C.Eng. 510). The format in this course is to deal with traffic planning, geometric design, construction and maintenance of highways. Although scenic evaluations are not a significant part of this course, route designation is, and scenic corridors have been considered. This group has a highly technical background.

Students in the Science Faculty (26.6%) were enrolled in two

geography classes, Resource Conservation (Geog. 424) and Mountain Geomorphology (geog. -28); four-fifths were from the latter. It was assumed that this group would have less of a technical education than engineers but more than the others.

Students from the Arts faculty (16.4%) were enrolled in Geography and Art and Design. It was hoped that this faculty would have an aesthetic training, but less than forty-five percent were from Art and Design.

Physical Education (11.3%) students were chosen for their training in defining particular problems in recreational research. Indeed many landscape assessments are done by recreational researchers. However this faculty was more widely dispersed than the others, into three different classes, Geography 424, Recreation 477 and Forest Science 462.

Forestry/Agriculture (6.2%) students made up the rest of the sample. All the students in this faculty were enrolled in Forest Science 462. These students had a broad view of wildland management and since attempts to measure scenery in the landscape have also been done by foresters, the inclusion of this group was desirable, particularly for noting where a professional bias existed.

d) Classes

The classes tested in this study have been previously reviewed in this chapter under the sub-heading Procedure: The Main Investigation. Table 4.1 shows these groups as a percentage of the total sample.

F. Other Questions

Questions eight to eleven concern the mobility of the subject and were designed to determine the subject's sense of place. It was believed that scenic preferences of a highly mobile individual would differ from those of a longtime local resident because of a wide range of visual experiences. But these questions were so poorly (or vaguely) answered that any statistical analysis would be unwarranted. To obtain this information from a questionnaire of this type, more preliminary investigations would be needed and a number of wordings should be experimented with to revise the questions so that precise information would be requested and given.

Questions twelve and fourteen determined the respondent's beliefs both in philosophy and toward nature. They were designed to determine the homogenity of the sample and were reasonably successful. More than eighty percent had a Christian upbringing and did not believe the natural landscape represented a problem, place or wealth nor an artifact, ideology or history. Fully three-quarters did, however, have what Meinig suggests is a romantic view (Meinig, 1976; 47), that the landscape represented nature. He suggests that this type of person would like to remove man from the landscape to see what the area is "really" like.

Questions sixteen to eighteen were designed to find out about the subject's participation in outdoor recreation. Most of the sample (97.8%) did participate in outdoor recreation in small informal groups. Less than a quarter (23.2%) belonged to any association concerned with the natural environment.

Question nineteen asked the subject whether natural areas made a positive contribution to life. This was found to be a "motherhood issue" - 175 of 177 students sampled answered in the affirmative and little or no further contribution was made to background information.

Questions twenty and twenty-one were designed to determine the subject's knowledge of the RDA, particularly between Edmonton and Devon. Very few people knew that an RDA had been established and only one person was 'adversely' affected by its establishment (when a friend had difficulty selling property). The series of questions from twenty-four to twenty-seven were also concerned with the respondent's awareness of the Area. Here they were asked to identify natural areas they found attractive or unattractive. Since so few were familiar with the area or even the establishment of the RDA, these questions were on the whole poorly answered.

Questions twenty-two and twenty-three are important for making suggestions as to the various land uses which are acceptable or unacceptable to the sample. These questions were designed to place the subject in the hypothetical position of choosing activities he or she would want or not want in the Area. These questions attempt to measure the respondent's environmental disposition which has been found to affect the ways in which people think about the everyday physical environment (Craik, 1975; 139). The subjects' suggestions will be included in the recommendations of chapter six.

G. Other Sample Characteristics

Not less than eighty percent of the sample were between the ages of nineteen and twenty-five, had one of six possible majors (Engineering, Geography, Recreation, Zoology, Geology, Forestry), were in third or fourth year university, were taught the Christian philosophy as a child and were unaffected by the RDA being established, having little or no knowledge of it. Less than a quarter had any training outside the university and most of those who did had technical training or were in the trades.

CHAPTER FIVE

ANALYSIS

A. Aims and Organization

The aim in this chapter is to establish a ranking of the photographs with regard to the collective scenic preference of the sample. The technique used to measure the sample's preferences is the semantic differential. The overall mean score of each photograph determined from semantic differential scale responses to that particular photograph was used to rank the photographs. Much of the analysis in this chapter will attempt to establish with assurance that mean values used to rank photographs were truly representative of all the responses and not an artificial summary concealing important differences. A final aim of this chapter is to determine whether a simple ranking technique could be substituted for the semantic differential test. In this final section, the mean scores for each photograph, and the single score of scale "L" "high scenic value - low scenic value" are ranked and correlated in an attempt to find if that scale could act as a surrogate for the semantic differential score.

A short hypothetical example introduces this chapter and explains the method of the following analysis. Preferences for each photograph are then analyzed to establish a ranking, and this is followed by a scale analysis of the most and least preferred photographs.

B. Hypothetical Example

The description and interpretation of the scenic assessment data which follow are best understood with reference to a hypothetical example. This will demonstrate two things: how the data were manipulated, and how the subsequent findings were interpreted. The central problem in the analysis is whether the mean scores represent a real or artificial summary of the respondents' preferences.

Assuming that a test has already been carried out on two respondents (X and Y), mean assessment scores could be calculated and reported as in Table 5.1, and represented diagrammatically as in Figure 5.1.

TABLE 5.1

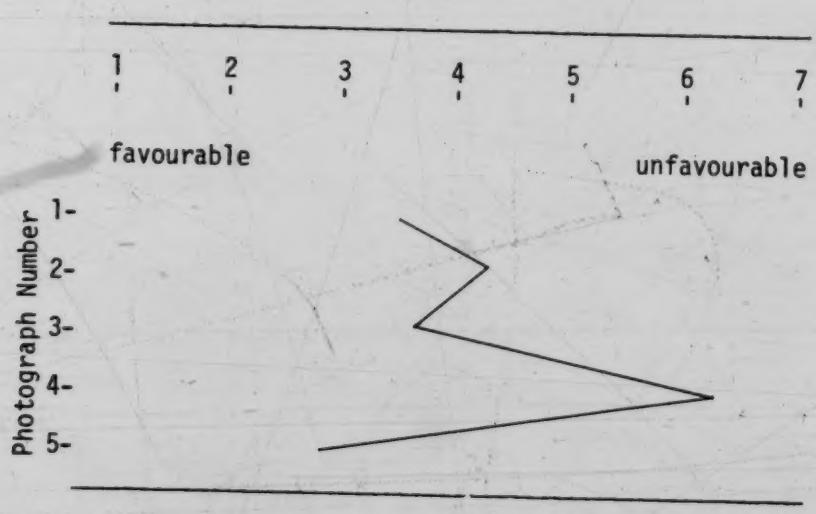
ASSUMED ASSESSMENT OF PHOTOGRAPHS
USING MEAN SCORES

Number of Photograph	Mean Score	Rank
1	3.5	2
2	4.2	4
3	3.7	3
4	6.4	5
5	2.8	1

Note: low mean scores = favourable response
high mean scores = unfavourable response

FIGURE 5.1

GRAPHIC PRESENTATION OF ASSUMED ASSESSMENT
OF PHOTOGRAPHS USING MEAN SCORES



This information allows the photographs to be ranked according to preference, as in Table 5.1. Photograph five, ranked highest, has the most positive score (2.8), and Photograph four, ranked lowest, the most negative (6.4). After this step the normal procedure is to identify the elements within each scene which distinguish it from others in an attempt to determine why a particular scene is preferred. The landscape dimensions of individual scenes are usually determined by measuring the physical attributes represented in that view. With the various elements identified and assigned a preference level, a map of the whole area from which the scenes were taken could be compiled according to area of preference.

The question remains, however, as to whether the mean scores summarize a consistent assessment between the sample of respondents

or whether they obscure important differences between them. If the former is true then the resulting 'preference map' is meaningful, in contrast to a less meaningful map if the latter is true. An intermediate step is therefore necessary to examine for consistency or inconsistency.

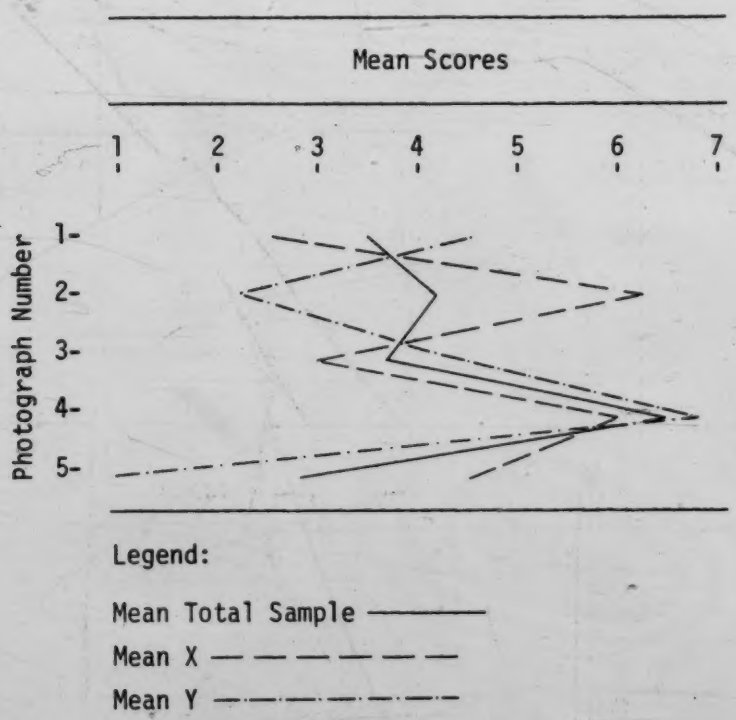
TABLE 5.2

HYPOTHETICAL DIFFERENCES IN ASSESSMENT OF PHOTOGRAPHS
(Case One)

Number of Photograph	Mean Score All	Rank All	Mean Score X	X Rank	Mean Score Y	Y Rank
1	3.5	2	2.5	1	4.5	4
2	4.2	4	6.2	5	2.2	2
3	3.7	3	3.0	2	4.4	3
4	6.4	5	6.0	4	6.8	5
5	2.8	1	4.6	3	1.0	1

FIGURE 5.2

GRAPHIC REPRESENTATION OF HYPOTHETICAL DIFFERENCES IN ASSESSMENT OF PHOTOGRAPHS (Case One)



Legend:

Mean Total Sample ————

Mean X — — — — — —

Mean Y —·—·—·—·—

Table 5.2 and Figure 5.2 indicate important differences between X and Y although they produce mean scores identical to those given initially. Moreover, the rankings also differ. This suggests that if planning recommendations were to be made based on overall mean scores, without considering the inconsistency of evaluations, then little (if any) pleasure would be gained by either X or Y from the implemendation of the recommendation. On the other hand, the second hypothetical example could equally have represented the initial mean.

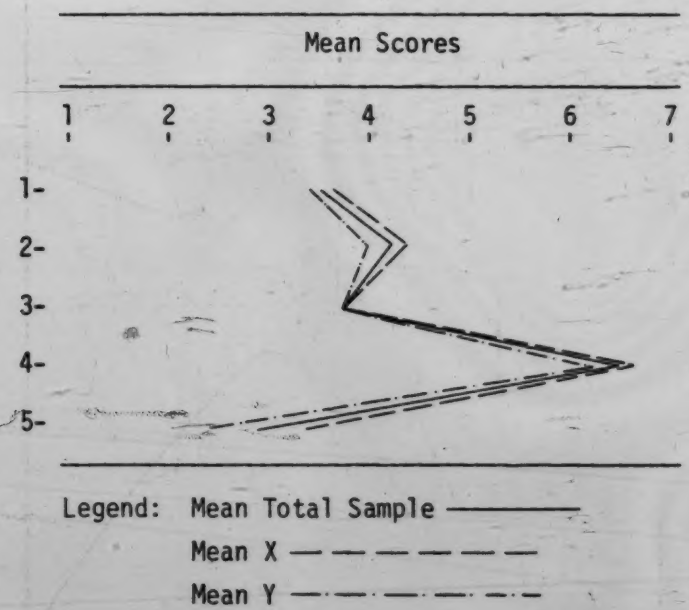
TABLE 5.3

HYPOTHETICAL DIFFERENCES IN ASSESSMENT OF PHOTOGRAPHS (Case Two)

Number of Photograph	Mean Score Total Sample	Rank All	Mean Score X	X Rank	Mean Score Y	Y Rank
1	3.5	2	3.6	2	3.4	2
2	4.2	4	4.4	4	3.9	4
3	3.7	3	3.7	3	3.7	3
4	6.4	5	6.6	5	6.2	5
5	2.8	1	3.3	1	2.3	1

FIGURE 5.3

GRAPHIC REPRESENTATION OF HYPOTHETICAL DIFFERENCES IN ASSESSMENT OF PHOTOGRAPHS (Case Two)



In contrast to case one, case two indicates a close agreement between X and Y. It also indicates that the mean shown initially is indeed representative of both respondents. The question that remains is to what extent do they agree.

In an earlier study, Zube (1974) analyzed the mean values for each of the twenty-five semantic scales for three groups on six sections of the landscape to assess the extent of agreement or "goodness of fit" between groups. He defined goodness of fit as a difference between means for two groups of less than 1.0 on a given scale. Using this same definition it can now be said that the extent of agreement or "goodness of fit" between the respondents in hypothetical case two is high. Now it can also be suggested that from case two, planning recommendations based on overall mean scores would more than likely be pleasing for both X and Y if the recommendations were implemented, because the mean score is a true indicator of preference for the sample.

The remaining investigation of this chapter will be similar to that of the hypothetical example. First, for each photograph, the sample's (177) mean score of the semantic differential will be calculated, and these ten scores will be ranked. Then the mean scores of a number of subgroups will be similarly calculated and ranked, and compared to the overall mean score. To test whether the overall mean score does in fact represent the mean of subgroups, mean score differences of less than 1.0 between subgroups will be interpreted as consistency, following Zube (1974). This same procedure will be followed to test the consistency of evaluation for each semantic

differential scale of the two photographs that are expected to have the greatest divergence - the highest and the lowest ranked.

In an attempt to follow the normal procedure of identifying elements within the scenes which are believed to contribute to its particular evaluation distinguishing preferred scenes from the others, the next chapter will be devoted solely to that purpose. Levels of preference will be determined and landscape elements which are identified in each level will be mapped so that recommendations can be made regarding the scenery.

C. Investigation of the Photographs

The subgroups from which mean photograph scores will be compared on a photo-by-photo basis are: sex, respondent's amound of reading, either average, above or below average; the faculty in which the respondent has registered and the class in which he was tested. These are the independent variables.

a) Mean Score of the Photographs and Rank

Earlier in the hypothetical example, it was assumed that the test had already been carried out. In the real test to calculate the mean of each slide, the mean scores for each scale for each slide were added together and averaged. The results of these calculations are shown in Table 5.4 and graphically represented in Figure 5.4

From Figure 5.4 it is evident that the mean score for each slide is

TABLE 5.4

Assessment of Photographs Using Mean Scores

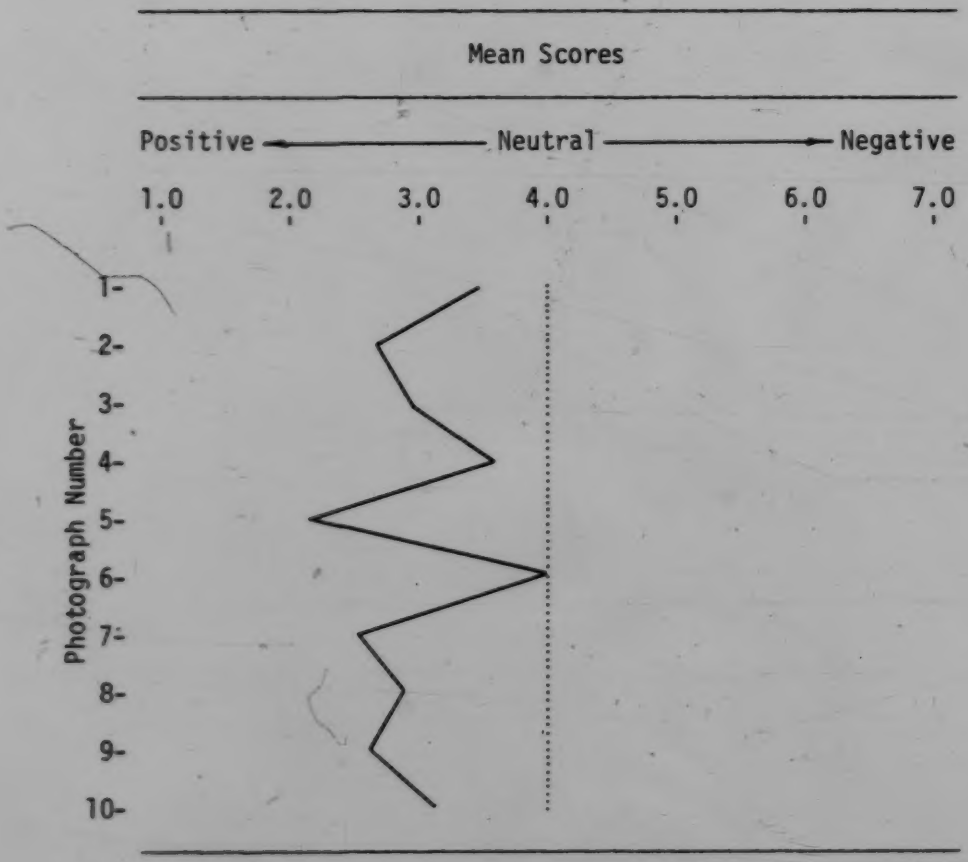
Number of Photograph	Mean Score	Rank
1	3.4994	8
2	2.6847	4
3	2.9508	6
4	3.5633	9
5	2.1424	1
6	3.9514	10
7	2.4938	2
8	2.8356	5
9	2.5644	3
10	3.0616	7

on the positive side of neutral. This would indicate first that the scenery of the RDA is considered (at least by the sample) to be attractive. Secondly, based on this first indication, the Provincial Government's decision to restrict development in the Area is supported at least on a scenic level.

This information, like the hypothetical example, also allows the photographs to be ranked according to preference which has already been done in Table 5.4. Photograph five, ranked highest, has the most positive

FIGURE 5.4

Graphic Representation of Assessment
of Photographs Using Mean Scores



score (2.14) and Photograph six was ranked lowest with the most negative score (3.95) - in this case the closest to neutral.

Again, as in the example, the question remains as to whether the mean scores summarize a consistent assessment between the respondents, or whether they mask important differences. An intermediate step is thus necessary here to examine for consistency or inconsistency between different groups of respondents. Tests were done on different sexes, the different amount of reading the respondents claimed to do, the different faculties they were registered in and the six different classes in which they were sampled. To ensure that the extent of agreement between the different groups remains reasonably high, goodness of fit was defined as a difference between means for two groups of less than 1.0 on a given photograph.

b) Ranked Means by Sex

Although there are some noticeable differences between sexes there are no differences greater than 1.0. The extent of agreement therefore remains reasonably high according to the definition. Figure 5.5 also indicates that on eight of the ten photographs, females liked the photographs slightly more than males; and finally the change of direction for the sexes is similar even though two crossovers exist.

TABLE 5.5

Differences in Assessment of Photographs
by Sex of Respondents

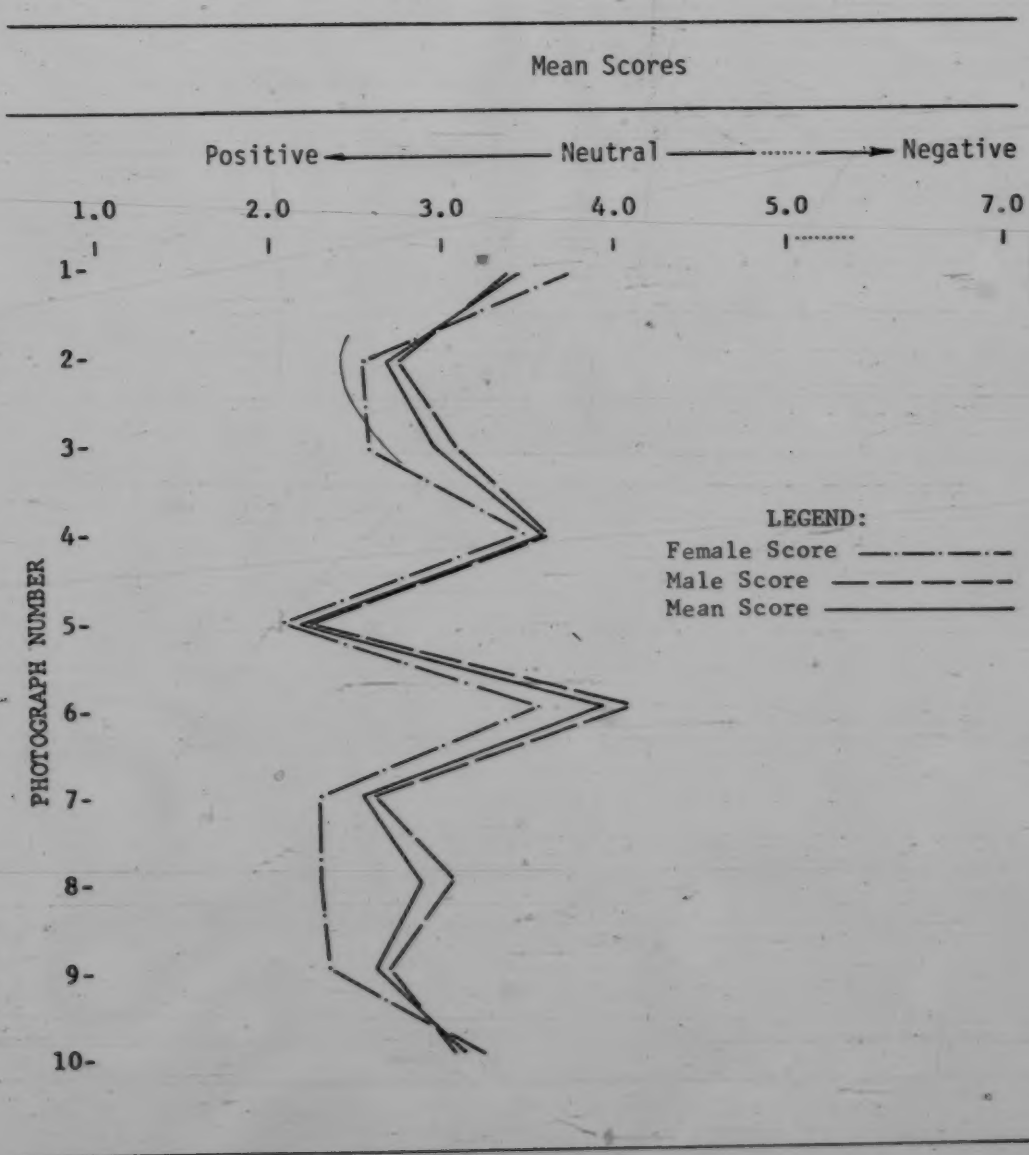
Photo No.	Mean Score Total Sample	Mean Score Males	Mean Score Females
1	3.49	3.40	3.78
2	2.68	2.74	2.51
3	2.95	3.07	2.57
4	3.56	3.59	3.46
5	2.14	2.17	2.05
6	3.95	4.08	3.54
7	2.49	2.57	2.25
8	2.83	3.02	2.25
9	2.56	2.65	2.27
10	3.06	3.02	3.18

c) Ranked Means by the Amount of Reading

It was assumed that a different level of literacy would indicate different levels of scenic awareness, particularly the deteriorating visual quality of our environment associated with urban development, residential sprawl, pollution, and resource extraction. It was also assumed that literacy and reading were associated, so to test the first assumption, the mean score of three levels of reading were compared to see if the

FIGURE 5.5

Graphic Representation of Assessment of Photographs by Sex of Respondents



overall mean obscured any differences here. It was believed that those who read more than average would be more sensitive to the visual landscape and therefore prefer the scenes more than those who read less than average. Table 5.6 and Figure 5.6 show the results of this test.

TABLE 5.6

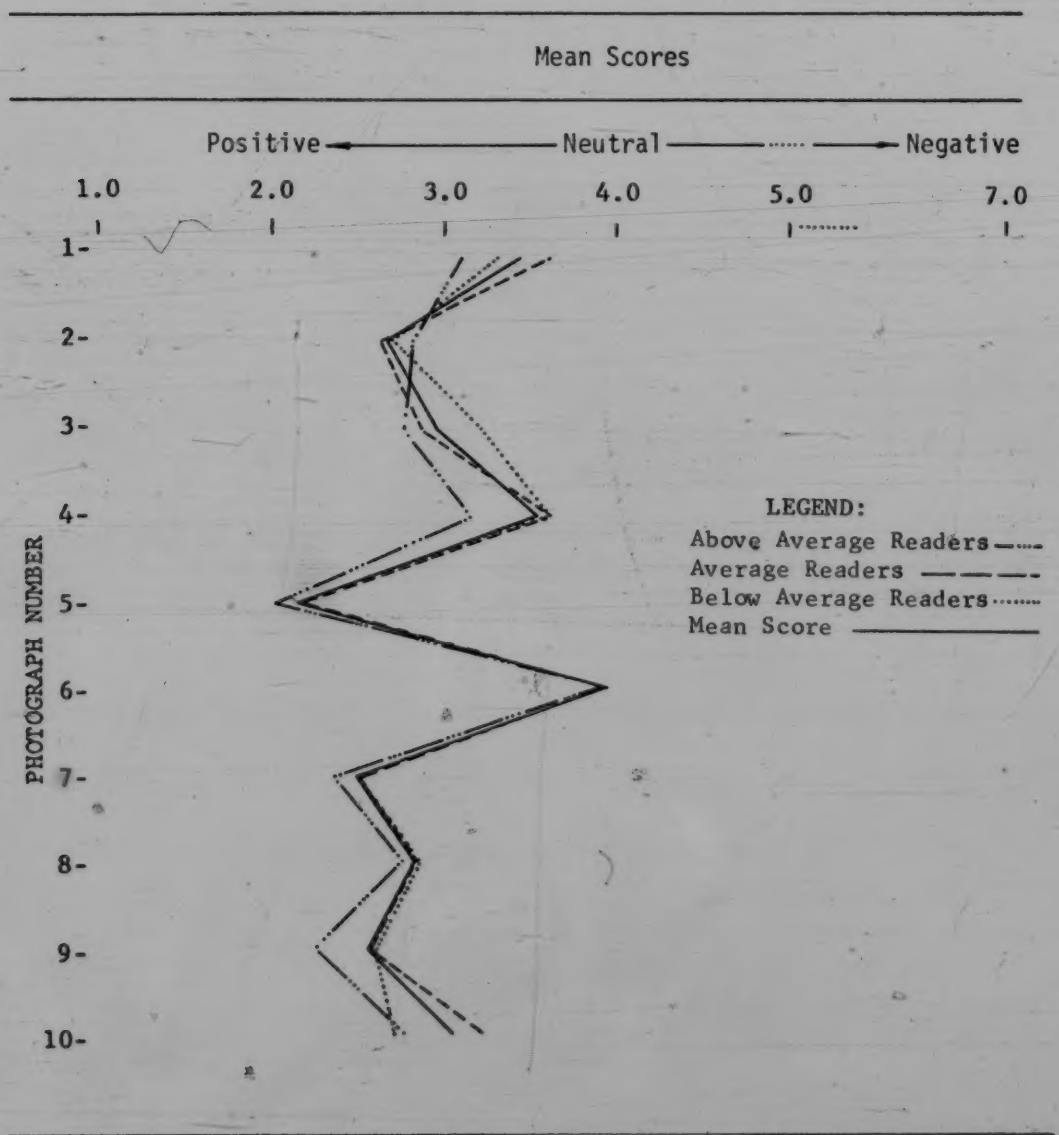
Differences in Assessment of Photographs
by Respondent's Amount of Reading

Photo No.	Mean Score Total Sample	Mean Score Average Readers	Mean Score Average Readers	Mean Score Average Readers
1	3.49	3.11	3.65	3.31
2	2.68	2.82	2.63	2.73
3	2.95	2.77	2.87	3.23
4	3.56	3.16	3.61	3.62
5	2.14	2.03	2.16	2.13
6	3.95	3.93	3.96	3.92
7	2.49	2.39	2.51	2.51
8	2.83	2.76	2.84	2.87
9	2.56	2.26	2.59	2.63
10	3.06	2.79	3.25	2.71

Figure 5.6 shows, in a similar way as Figure 5.5 did for sexes, that although there are some noticeable differences between the three reading groups there are no differences greater than 1.0, indeed none greater than

FIGURE 5.6

Graphic Representation of Assessment of Photographs by Respondent's Amount of Reading



0.54 (Table 5.6). For seven photographs, those who read more than average did prefer the scenes over the others, but since the differences were not greater than 1.0 the initial belief was not borne out. The changes of direction for reading groups, like sexes, are similar even though crossovers do occur.

d) Ranked Means by Faculty

It was postulated that people who choose different streams of education would collectively have different preferences. For instance, people in a technical stream, for example, engineering, would differ from a more liberal education, for example, arts. Since it is important to have a consensus of opinion when recommending the designation of scenic areas, this belief was tested twice, firstly for the faculty in which the respondent was registered and secondly for the class in which they were tested.

This information shows fewer conspicuous differences than previously shown for sexes and amount of reading. None of the photograph assessments for faculties differs by more than 1.0 and the change of direction for each faculty for each photograph is similar except for the "other" group on photograph three. From Figure 5.7 it would seem than engineering and forestry students were neutral more often than the other faculties. This final point hints of a professional bias, but from this information further comment would simply be speculation.

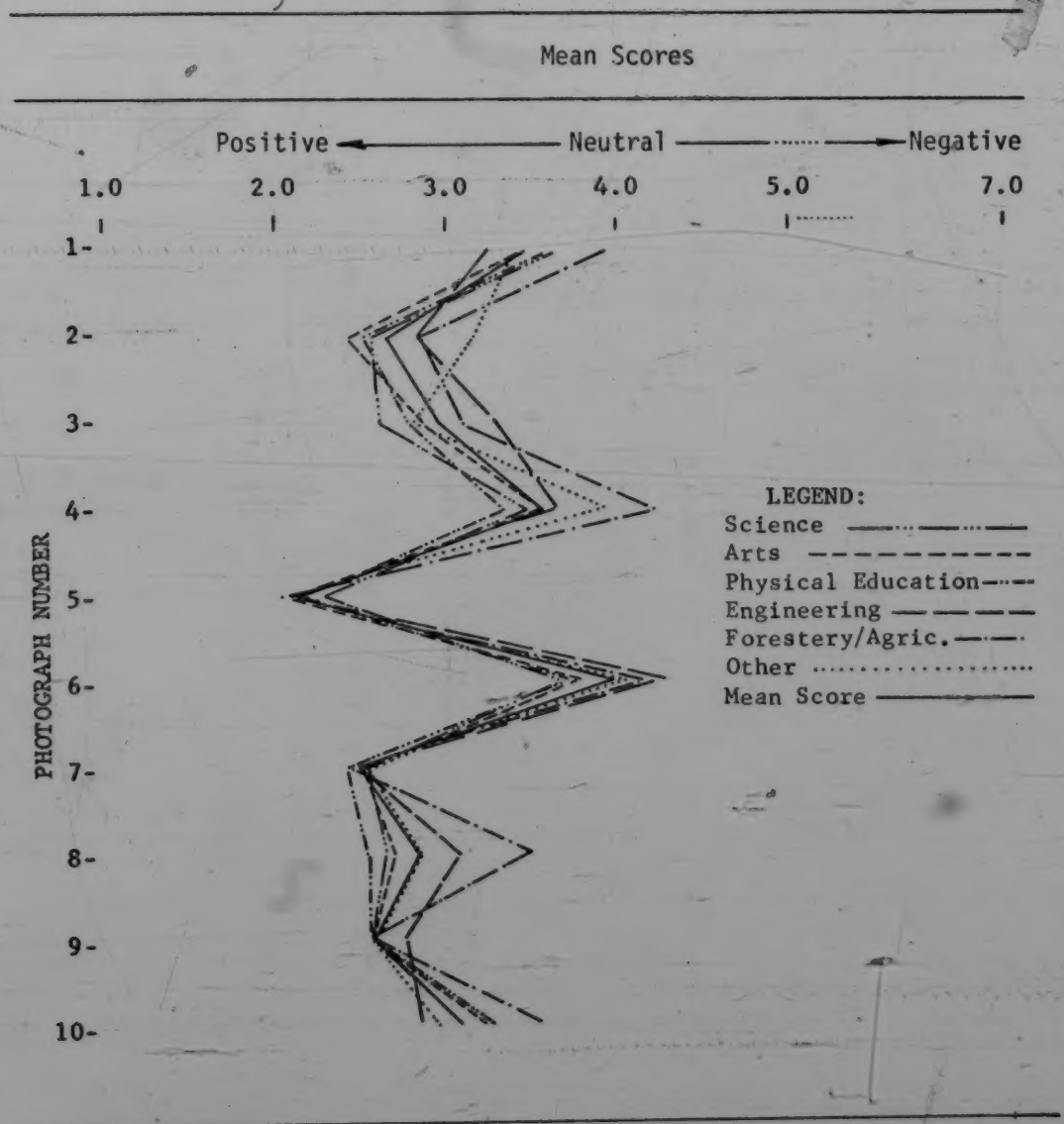
TABLE 5.4

Differences in Assessment of Photographs by Faculty of Respondent

Photo No.	Mean Score	Science	Arts	Phys. Educ.	Engineering	Forestry/Ag.	Others
1	3.49	3.66	3.47	3.63	3.25	3.97	3.43
2	2.68	2.55	2.43	2.53	2.83	2.86	3.18
3	2.95	2.63	2.86	2.78	3.30	3.10	2.81
4	3.56	3.47	3.56	3.34	3.51	4.20	3.93
5	2.14	2.26	2.07	2.19	2.09	2.03	2.07
6	3.95	3.65	3.79	3.71	4.29	4.41	4.04
7	2.49	2.54	2.50	2.40	2.48	2.41	2.54
8	2.83	2.64	2.69	2.53	3.08	3.48	2.63
9	2.56	2.52	2.38	2.37	2.74	2.56	2.55
10	3.01	3.09	3.22	3.25	2.81	3.55	2.94

FIGURE 5.7

Graphic Representation of Photographs
by Respondent's Faculty Registration



e) Ranked Means by Class

By using the same technique as above each class that was sampled was compared for differences - Table 5.8 and Figure 5.8.

As was the situation in all previous tests there are no differences greater than 1.0. The change of direction of photograph assessments is consistent from class to class except the Recreation class on photograph number eight.

The regularity with which the independent variables agree suggests that the mean photograph scores do indeed represent a truly consistent assessment of preference. This therefore suggests that by using the standard of "goodness of fit" of less than 1.0 as recommended by Zube, any map based on the information from Table 5.1 would be meaningful as a tool in contributing to the comprehensive plan of the RDA.

But another question remains, however, as to whether the mean scores of each photograph summarize a consistent assessment of semantic scales or whether they mask important differences. Again using Zube's goodness of fit of less than 1.0 difference on a given scale, the mean score of each photograph should be checked. However, to avoid excessive amounts of repetition the highest and lowest ranked photographs, that is, numbers five and six, will be considered as good examples of possible extreme differences expected. They will be tested by sex differences, amount of reading differences and faculty of registration differences.

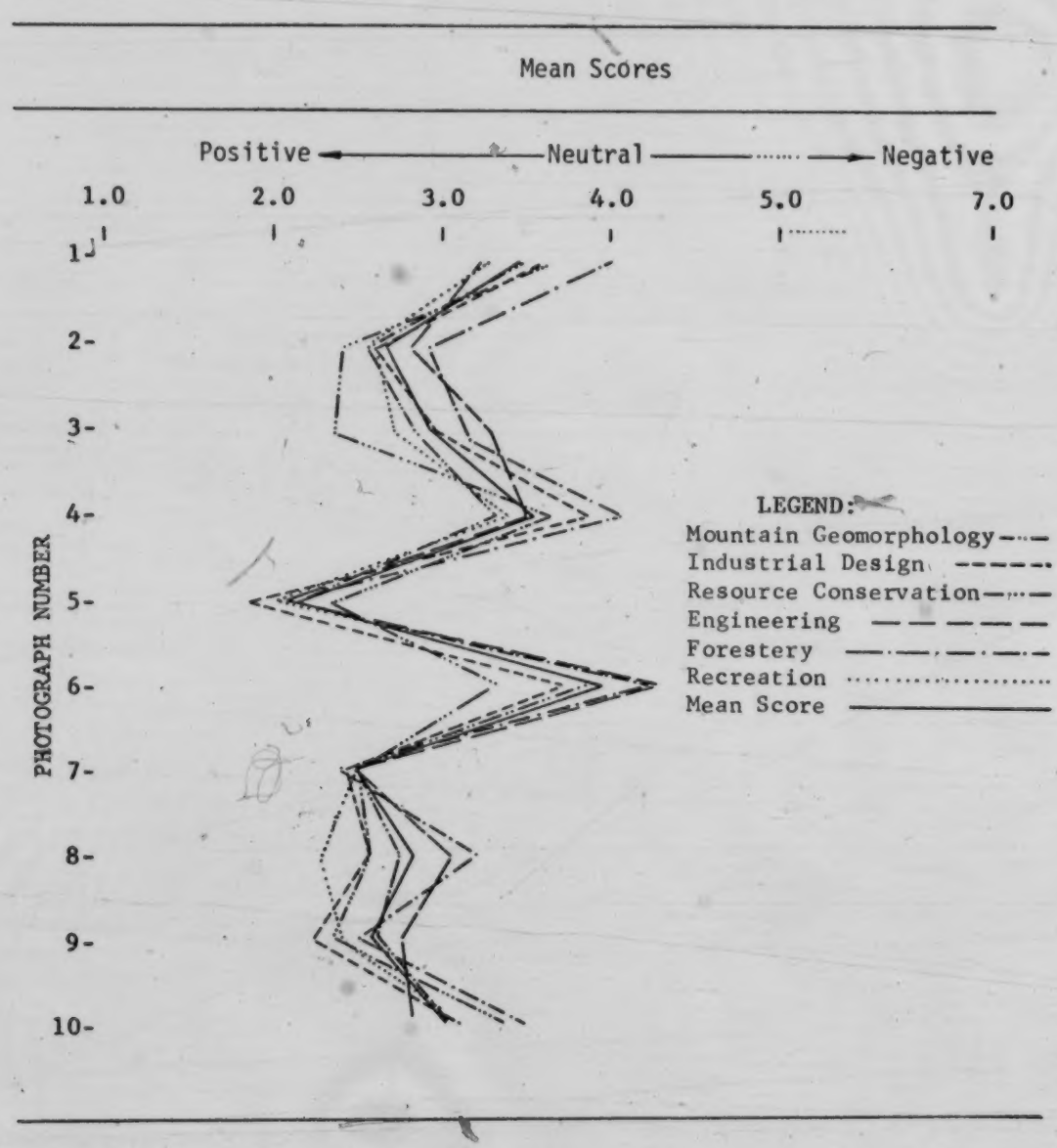
TABLE 5.6

Differences in Assessment of Photographs by Class of Respondent

Photo No.	Mean Score Total Sample	Mountain Geomorphology	Industrial Design	Resource Conservation	Engineering	Forestry	Recreation
1	3.49	3.52	3.62	3.70	3.25	4.04	3.30
2	2.68	2.59	2.61	2.42	2.83	2.94	2.61
3	2.95	2.86	2.97	2.38	3.30	3.02	2.72
4	3.56	3.34	3.89	3.66	3.51	4.09	3.40
5	2.04	2.17	1.84	2.35	2.09	2.06	2.17
6	3.95	3.90	3.72	3.31	4.29	4.27	3.70
7	2.49	2.54	2.43	2.50	2.48	2.38	2.49
8	2.83	2.77	2.57	2.58	3.07	3.21	2.27
9	2.56	2.62	2.21	2.34	2.74	2.50	2.40
10	3.01	3.08	3.10	3.36	2.81	3.48	2.91

FIGURE 5.8

Graphic Representation of Photographs
by Class Enrollment of Respondent



D. Analysis of Scales

TABLE 5.9

Differences in Scale Assessment of Photograph Five by Sex of Respondent

Scale	Mean Score Total Sample	Mean Score Males	Mean Score Females
A	1.83	1.85	1.76
B	1.94	1.94	1.97
C	1.95	1.94	2.00
D	1.81	1.78	1.93
E	2.09	2.17	1.83
F	1.98	2.01	1.90
G	3.52	3.50	3.55
H	2.02	2.09	1.79
J	2.12	2.17	1.95
K	2.11	2.20	1.83
L	1.91	1.98	1.69

As might be expected of the most preferred photograph the eleven scale assessments are very consistent and there were no striking differences. Sex differences on the least preferred scene were similarly considered and the findings can be compared; see Figures 5.9 and 5.10 and Tables 5.9 and 5.10.

FIGURE 5.9

Graphic Representation of Scale Assessment of Photograph Five by Sex of Respondent

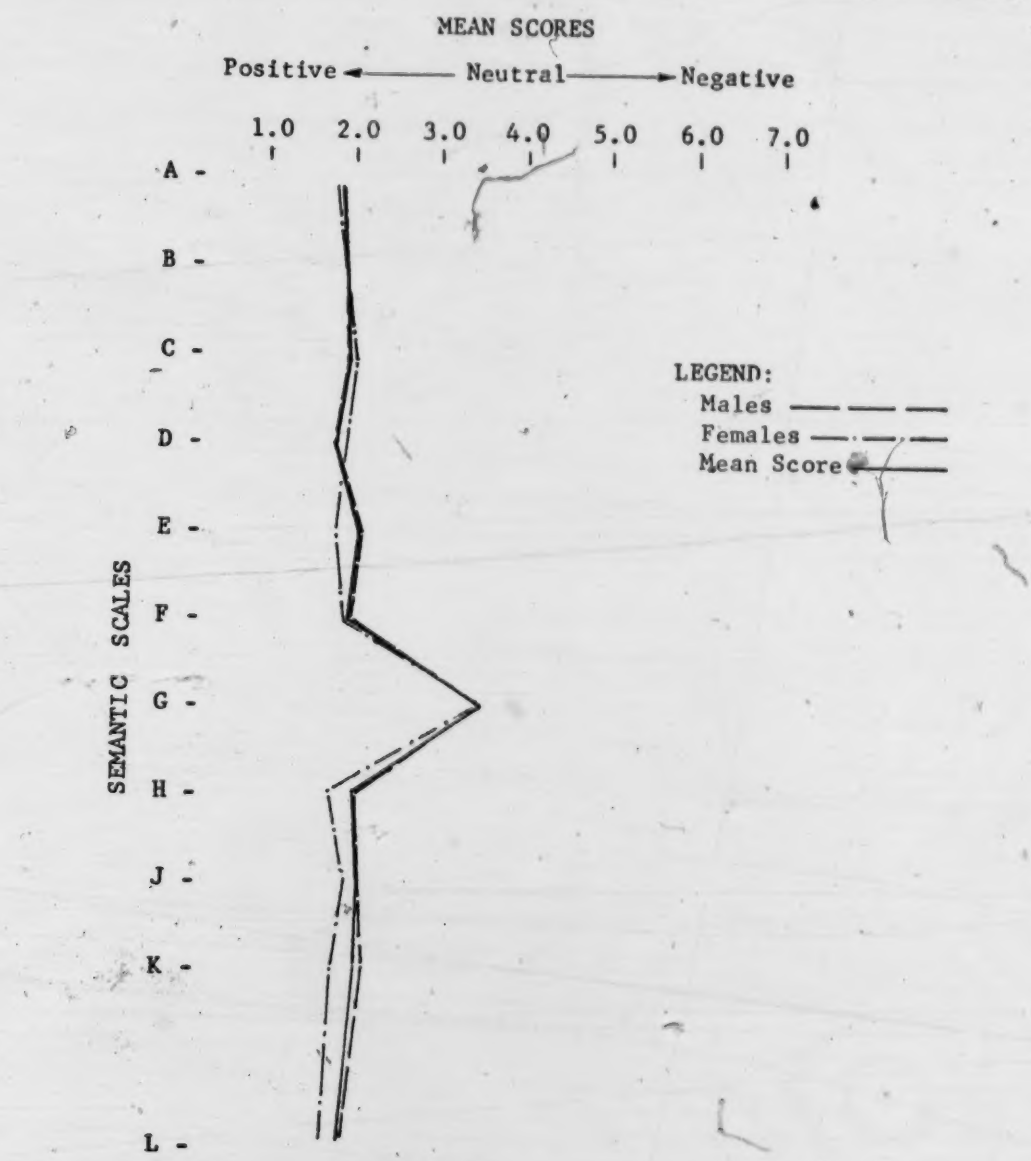


TABLE 5.10

Differences in Scale Assessment of Photograph Six by Sex of Respondent

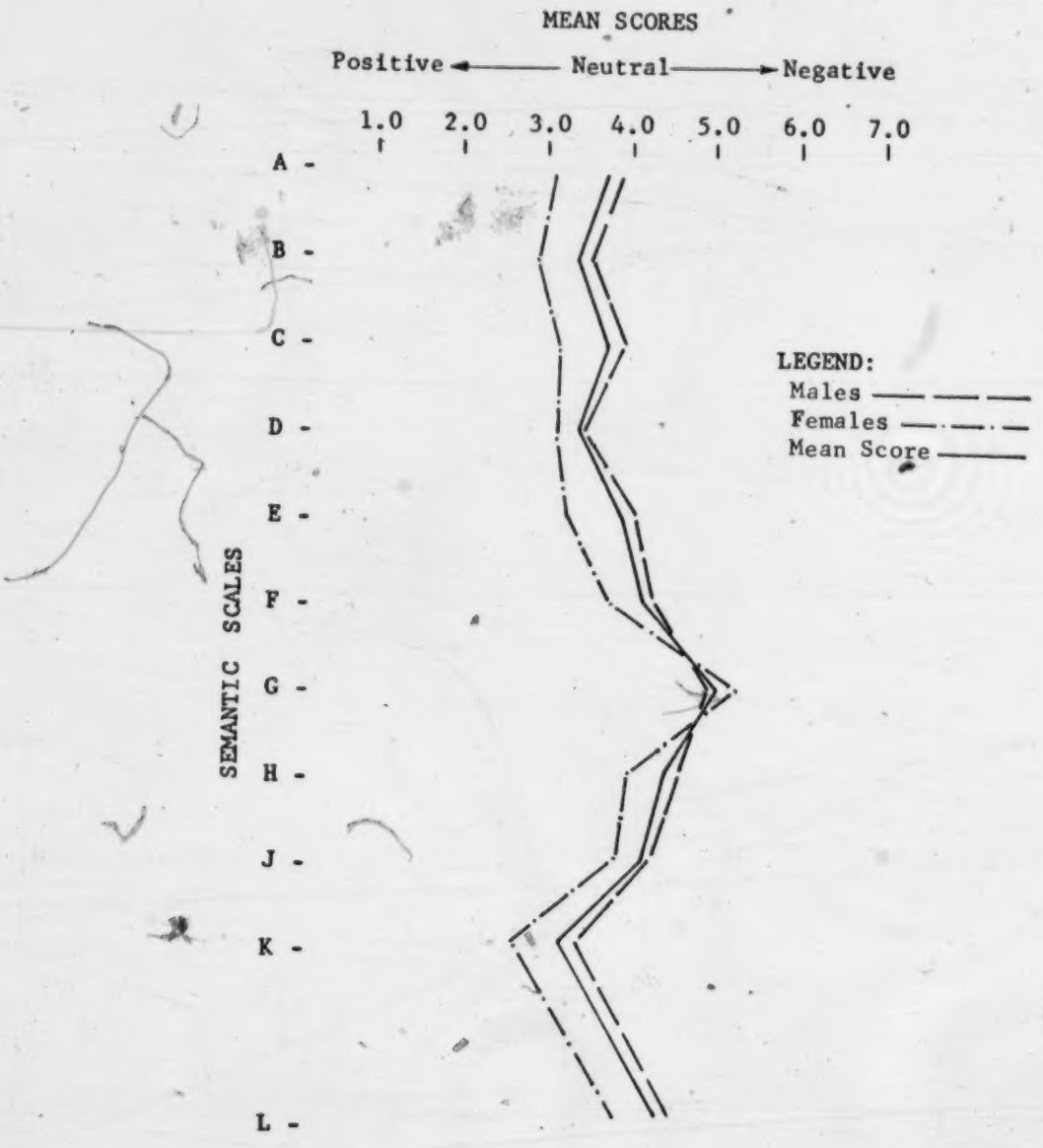
Scale	Mean Score Total Sample	Mean Score Males	Mean Score Females
A	3.75	3.97	3.09
B	3.40	3.56	2.88
C	3.77	3.93	3.18
D	3.41	3.48	3.16
E	3.91	4.11	3.29
F	4.20	4.34	3.79
G	5.07	4.99	5.34
H	4.49	4.64	4.00
J	4.21	4.31	3.91
K	3.26	3.44	2.69
L	4.41	4.60	3.93

In Table 5.10 a few differences are noticeable, for example scale A difference = 0.88 but no differences are greater than 1.0. Females prefer the scene to males and find it a more usual setting, but even with this difference the extent of agreement remains reasonably high, according to Zube's definition.

The results from testing different levels of reading against scales

FIGURE 5.10

Graphic Representation of Scale Assessment of
Photograph Six by Sex of Respondent



for photographs five and six indicate a high degree of agreement. There are no striking differences recorded. See Tables 5.11 and 5.12, and Figures 5.11 and 5.12.

TABLE 5.11

Differences in Scale Assessment of Photograph Five
by Respondent's Amount of Reading

Scale	Mean Score Total Sample	Mean Score Average Readers	Mean Score >Average Readers	Mean Score <Average Readers
A	1.83	1.77	1.83	1.88
B	1.94	1.77	2.02	1.83
C	1.95	1.72	1.87	2.02
D	1.81	1.63	1.93	1.60
E	2.09	2.00	2.07	2.18
F	1.98	1.81	2.02	2.00
G	3.52	3.54	3.51	3.51
H	2.02	1.90	2.04	2.02
J	2.12	2.18	2.15	2.02
K	2.11	2.00	2.08	2.25
L	1.91	1.72	1.92	2.00

FIGURE 5.11

Graphic Representation of Scale Assessment of
Photograph Five by Respondent's Amount of Reading

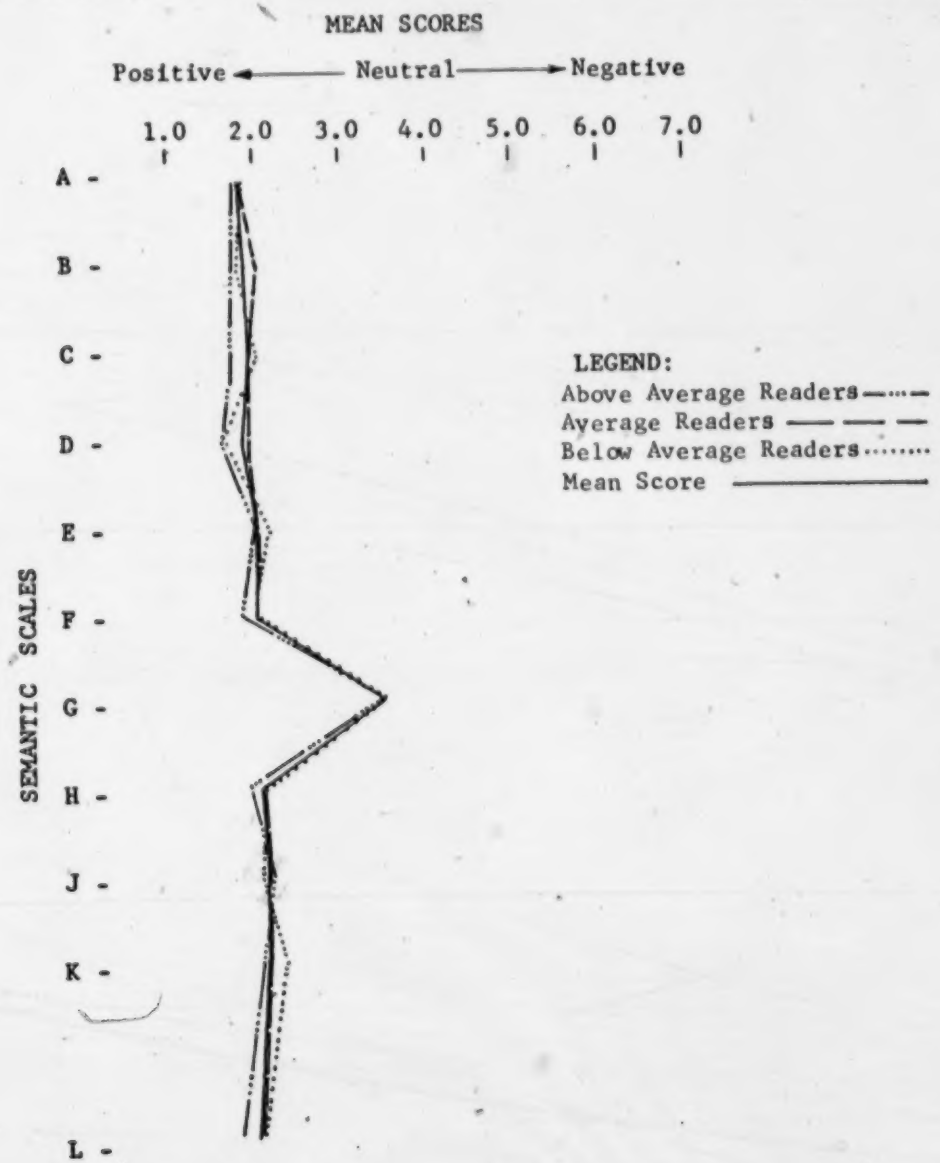


TABLE 5.12

Differences in Scale Assessment of Photograph Six
by Respondent's Amount of Reading

Scale	Mean Score Total Sample	Mean Score Average Readers	Mean Score >Average Readers	Mean Score <Average Readers
A	3.75	3.50	3.75	3.88
B	3.40	3.27	3.36	3.55
C	3.77	3.50	3.71	4.07
D	3.41	3.18	3.61	2.97
E	3.91	3.95	3.85	4.04
F	4.20	4.31	4.23	4.09
G	5.07	5.09	5.21	4.72
H	4.49	4.72	4.45	4.46
J	4.21	4.45	4.23	4.04
K	3.26	3.31	3.23	3.32
L	4.41	4.72	4.34	4.53

Responses to the scales of photograph five were also consistently similar for faculty differences as can be seen from Table 5.13.

When the scales of photograph six were considered by faculty enrollment, six of the eleven scale differences ranged from 1.02 to 1.37. Even though these findings are not consistent with the others, the responses of this photograph by the six faculties closely cluster around the neutral area

FIGURE 5.12

Graphic Representation of Scale Assessment of
Photograph Six by Respondent's Amount of Reading

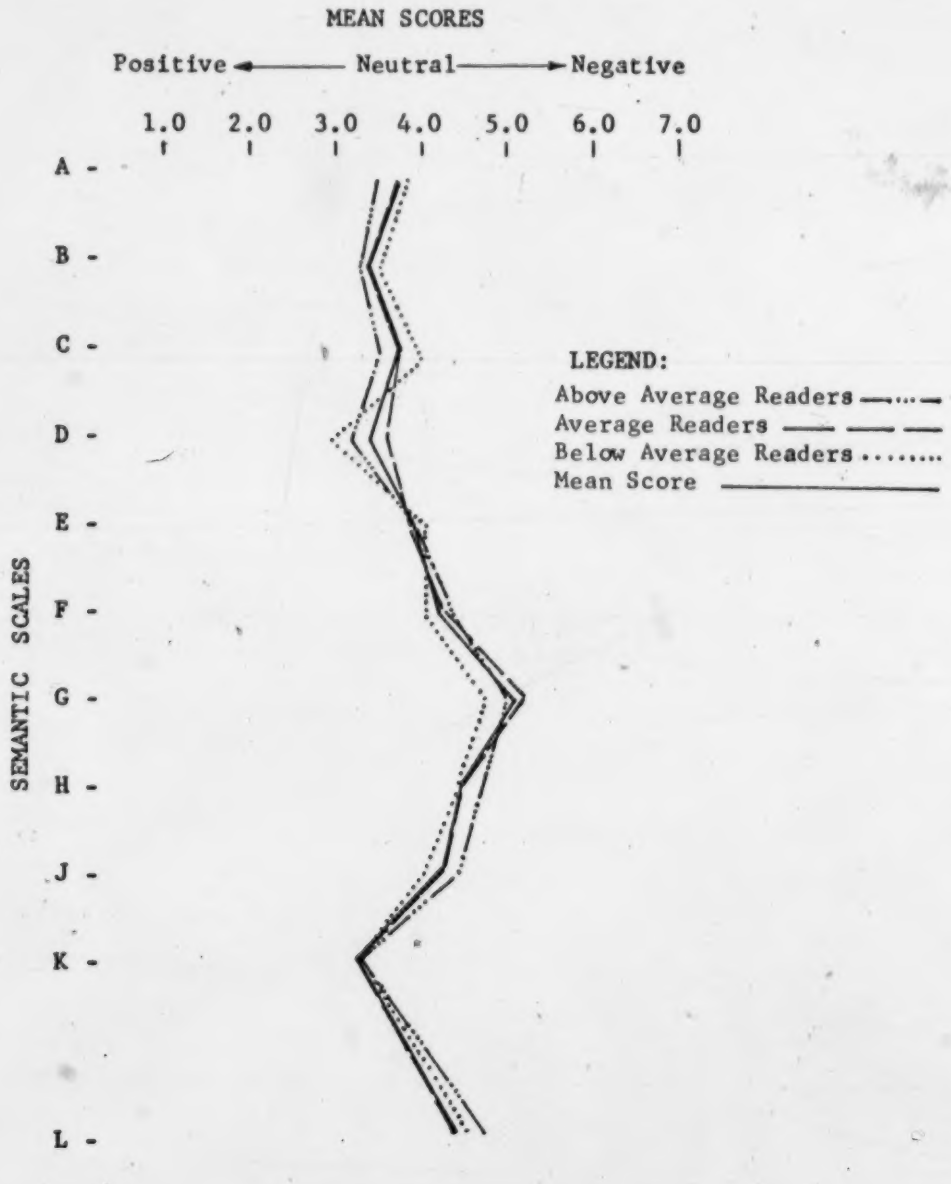


TABLE 5.13

Differences in Scale Assessment of Photograph Five by Faculty of Respondents

Scale	Mean Score Total Sample	Science	Arts	Phys. Educ.	Engineering	Forestry/Ag.	Others
A	1.83	1.91	1.69	1.80	1.86	1.81	1.81
B	1.94	2.06	2.06	1.75	1.91	1.81	1.81
C	1.95	2.06	1.93	1.95	1.88	2.00	1.96
D	1.83	1.78	1.82	2.40	1.57	2.27	1.72
E	2.09	21.7	1.89	2.15	2.08	2.00	2.27
F	1.98	2.17	1.96	1.95	1.93	1.90	1.72
G	3.52	3.87	3.51	3.70	3.27	3.18	3.36
H	2.02	2.12	1.89	2.10	2.08	1.45	2.00
J	2.12	2.36	2.00	2.20	2.06	1.90	1.81
K	2.11	2.10	1.93	1.90	2.28	2.00	2.27
L	1.91	2.00	1.96	1.85	1.86	1.81	1.90

FIGURE 5.13

Graphic Representation of Scale Assessment of Photograph Five by Faculty of Respondents

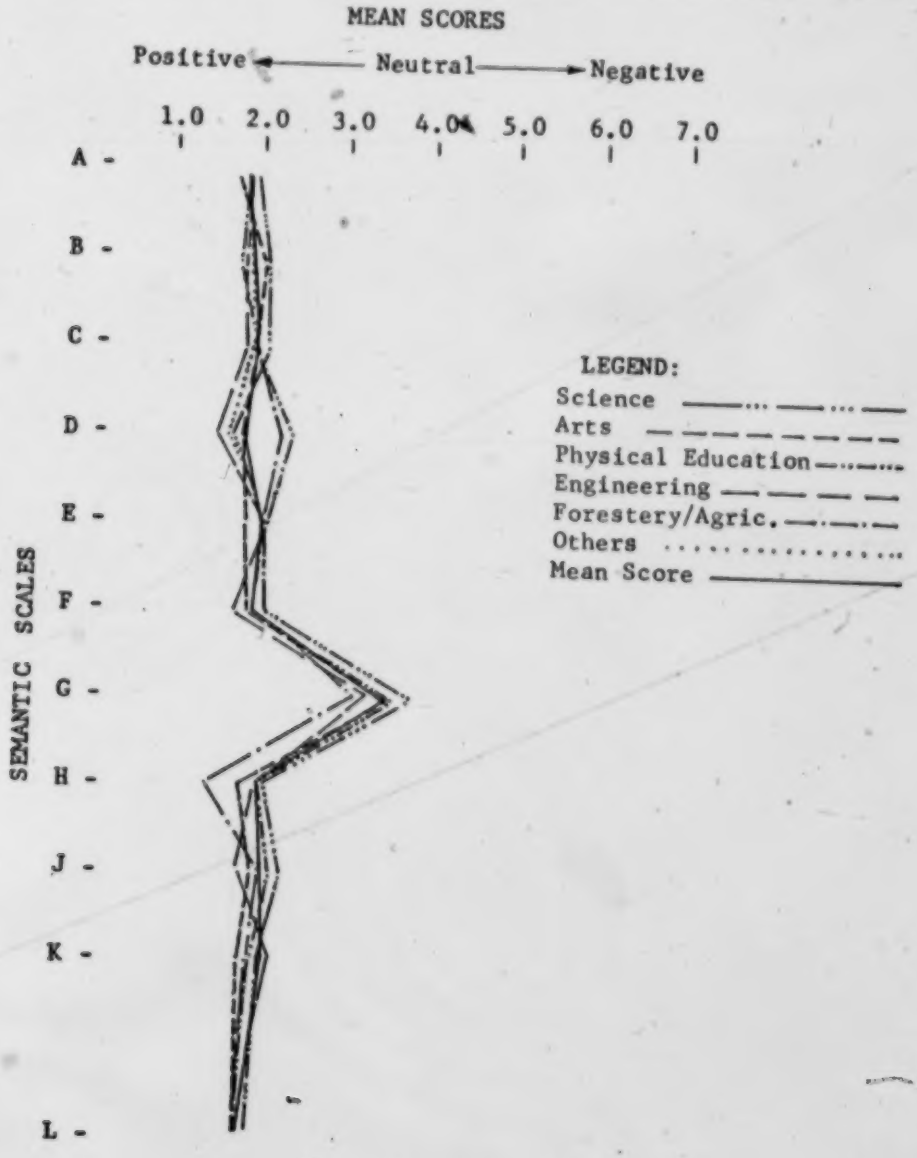


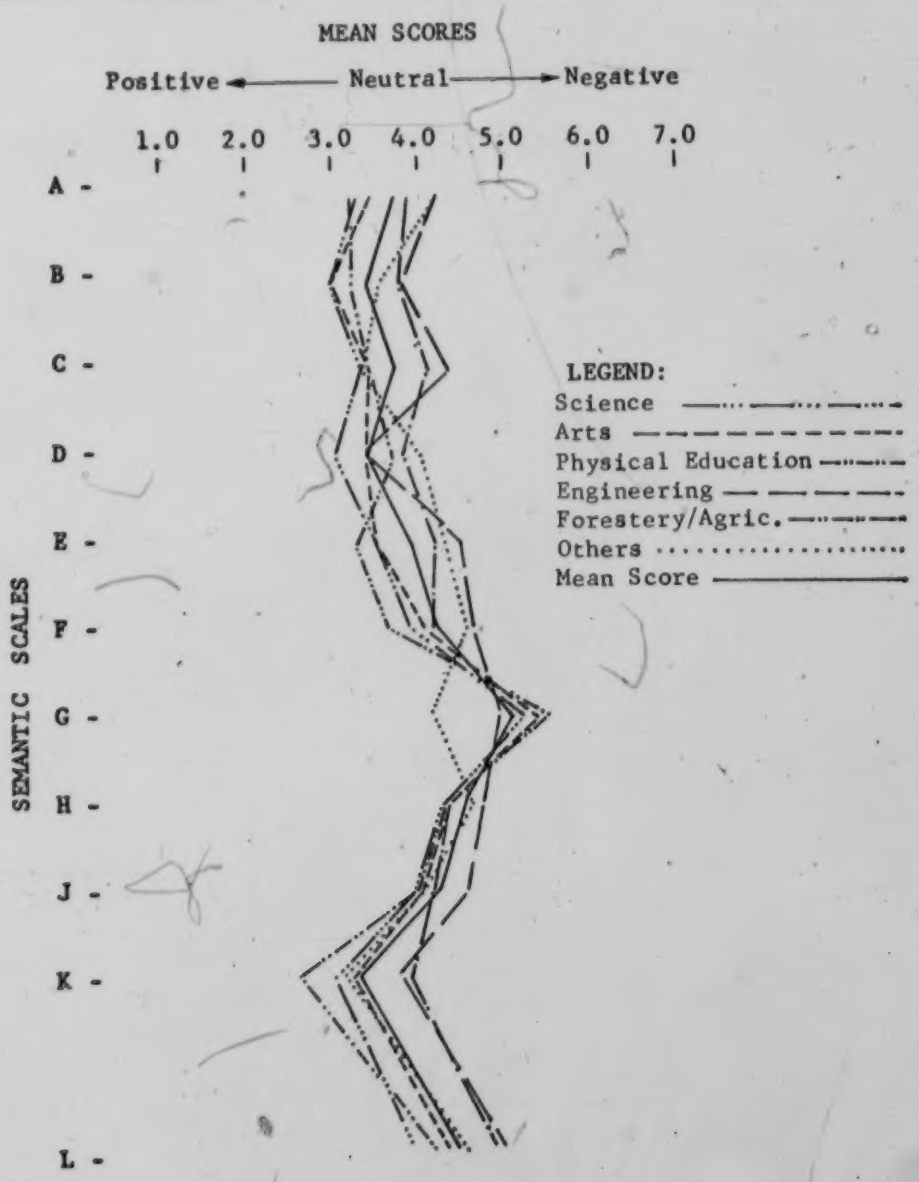
TABLE 5.14

Differences in Scale Assessment of Photograph Six by Faculty of Respondents

Scale	Mean Score Total Sample	Science	Arts	Phys. Educ.	Engineering	Forestry/Ag.	Others
A	3.76	3.32	3.52	3.25	4.27	3.91	4.27
B	3.40	3.00	3.03	3.25	3.84	3.81	3.54
C	3.77	3.38	3.41	3.45	4.39	4.09	3.36
D	3.41	3.06	3.41	3.75	3.33	3.90	4.09
E	3.91	3.48	3.51	3.30	4.52	4.18	3.36
F	4.21	3.91	4.10	3.70	4.61	4.18	4.54
G	5.08	5.21	5.41	5.55	4.83	5.00	4.18
H	4.49	4.25	4.34	4.30	4.78	4.36	4.81
J	4.21	3.93	4.06	4.05	4.57	4.18	4.18
K	3.26	2.97	3.10	2.55	3.74	3.81	3.09
L	4.44	3.87	4.31	4.15	4.96	4.81	4.54

FIGURE 5.14

Graphic Representation of Scale Assessment of Photograph Six by Faculty of Respondents



and the overall mean (3.95). Although the extent of agreement is not as high as all the previous tests, it is obvious from Figure 5.14, that agreement is nevertheless moderately high.

The consistency with which the independent variables agree suggests that the photograph mean does indeed represent the true scale responses for that photograph and does not obscure important differences between groups. This therefore supports the ranking of the photographs which was initially shown in Table 5.4. Two tasks remain: the identification of photograph dimensions and the mapping of the Area using these dimensions, both of which will be attempted in a later chapter.

E. Semantic Differential Surrogate Test

The task remaining in the investigation of the photographs is to determine whether there is an easier but equally accurate technique to rank photograph preference than by using a number of semantic scales. It was earlier hypothesized that scale L "high scenic value - low scenic value" alone might be an effective surrogate for the ten scales. To test the claim that photograph ranking obtained from using scale L alone is as effective as that obtained from the mean of the ten other scales, Spearman's Rank Correlation (Johnson, 1973) was used.

The calculated value from this test was 0.636 and the tabulated critical value of Spearman's rank correlation coefficient at $\alpha = 0.05$ is 0.648. Therefore the claim of similarity is rejected. If however

α = 0.10 had been used the correlation would have been significant and the claim supported, suggesting that there is a correlation between the two rankings. But α = 0.10 is generally unacceptable in social science research. Perhaps two scales instead of one would be an accurate surrogate.

F. Conclusions

This chapter has ranked ten photographs by using mean scores of eleven seven-step semantic scales for each photograph. The ranking has indicated scenic preferences to be between neutral and positive. Sections C and D of this chapter allow the conclusion to be made that the mean does in fact represent the preferences of the sample and is not some artificial summary. Therefore, if the landscape dimensions of these photographs can be isolated and identified, a meaningful map can then be compiled which makes planning recommendations in specific areas based on scenic preference. This is attempted in a later chapter.

The surrogate calculation of section E of this chapter allows the conclusion that there is a correlation between the mean of each slide and the sample's responses to the scale L. However the correlation is insufficient to suggest that the one scale could replace the complete test. It might be suggested here that for a very superficial appraisal, scale L alone could act as an indicator of preference.

The area in which a simple scale could be used is in another similar but larger test. In large tests, boredom begins to affect the answers of

many people. Although the correlation of scale L and the full set of scales is insufficient to suggest replacing the full set with scale L; it should be suggested that to avoid undue tiresomeness, a large sample might be administered a one scale test while a cooperative sample of volunteers might be given a complete version of the test.

CHAPTER SIX

APPLICATION OF RESULTS

A. Introduction

This chapter will combine the physical description of each photograph (Table 3.2) with the ranked order of photograph preference (Table 5.4) with the purpose of establishing a set of maps that allow planning suggestions to be made based on scenic preference. If it is possible to designate areas of different scenic preferences and feasible to make suggestions regarding their future land uses, then it is also important that this chapter suggest activities which seem to be acceptable to most people, and those which are considered unacceptable.

Two assumptions are necessary to compile a map of preferred scenery. These assumptions are shared by many authors (Kreimer, 1977). They are: first, that visual characteristics of the environment can be measured, and that it is possible to describe the appearance of the landscape in terms of quantity of specific characteristics; and secondly, that to a large extent individual preferences will be associated with the visual characteristics of the environment. The task of this chapter is to assemble the visual traits in such a way that the landscape dimensions can be grouped into levels of preference. This will be done within a matrix.

To explain how the visual traits of the landscape will be assembled into different levels of preference, it must be shown that each photograph, considered separately, can be divided into different characteristic groups by its visual content. The first thing to note therefore is that this is a subjective consideration. Secondly, in the procedure of considering each scene, there are two hierarchical associations. First, the number of land forms in a scene are considered to be more important than the degree of naturalism and the least important photograph characteristic is viewer position. The second hierarchical consideration is contained within the first and is in the land use classification. Here development, particularly the absence of man-made disturbances, seems to be more important than the presence of water. The presence of water is more important than the presence of trees. And finally agricultural uses, either pasture or crops, seems to be the least important characteristic. In other words, the first criterion selected when considering how to divide the ranked photographic slides into high, medium and low divisions is land form. The second criterion, in combination with land form is land use - first considering disturbances by man, then the presence of water, then the presence of trees, and finally, type of agricultural use. The third criterion is the degree of naturalism - either high, medium or low, and finally the least important criterion to be considered is viewer position.

TABLE 6.1

Planning Matrix

Photograph Rank	Photograph Number	LAND FORMS							LAND USES								NATURALISM			VIEWER POSITION	
		slip-off slopes (& island)	increasing steepness → undulating hills	sand dune landscape	mature ravine	young ravine	steeply sloped bank	rugged cliffs	Trees (primary) very noticeable	Trees (primary) noticeable	Water secondary) Present	Water secondary) Absent	Agricultural (primary) Pasture	Agricultural (primary) Crops	Development (secondary) Obvious	Development (secondary) Insubstantial	High	Medium	Low	Normal	Superior
1	5	x	x				x		x		x		x			x	x				x
2	7	x	x				x			x	x					x	x			x	
3	9		x						x			x		x	x			x			x
4	2							x		x	x					x	x			x	
5	8					x			x			x				x		x		x	
6	3				x				x			x				x		x			x
7	10	x	x						x		x		x		x			x			x
8	1	x	x							x		x			x				x	x	
9	4						x	x	x			x	x		x				x	x	
10	6			x						x		x	x		x				x	x	

By grouping photograph characteristics into high, medium and low rankings from the matrix, different levels of preference can be determined (Zube (1973) found three levels to be effective). Once this is complete, recommended land use practices can be suggested for areas of the RDA that contain the dimensions of each particular preference level. For instance, it will be suggested that areas that have landscape elements that are characteristic of a high ranking should be scenically preserved. Different suggestions will be made for the groups of landscape dimensions of other rankings.

B. Development of a Planning Matrix

To combine the rankings of Table 5.4 and the photograph descriptions of Table 3.2, a number of modifications to Table 3.2 were implemented. First the photographs were rank ordered. Secondly, land use categories were collapsed into two qualitative distinctions for both of the primary and secondary uses. Third, the degree of naturalism was collapsed from ten rankings to three: high, medium and low. Finally viewer position was included - see Table 6.1.

C. Interpretation of Planning Matrix

Before discussing the interpretation of the planning matrix, Table 6.1, which will be used to locate areas in the RDA of high, medium and low preferences, it is necessary to make a distinction concerning the existing land uses in the RDA. Much of the land is already fully developed - most

of it is arable - however, there are also residential and recreational developments. It is unreasonable to suggest that the owners of fully developed land should be compelled to change their present land use on scenic grounds; therefore the scenic evaluation of this thesis will only be concerned with the undeveloped and marginally developed areas of the RDA. Also it would be difficult, indeed contradictory, to suggest that their property be developed more (eg., tree planting). In fact, the present legislation prohibits activities which are incompatible with the use when established. With this in mind, the remaining area can be assessed for its visual preference and the fully developed areas are recommended to remain under the "blanket protection" of the present legislation. This area is shaded in Figure 6.1.

a) Areas of Scenic Preservation

The most preferred photographs in this study are scenes five and seven. Since an effort was made to equalize photograph quality and content between each scene, it is assumed that the landscape elements represented in these scenes must therefore be responsible for their favourable rating. Table 6.1 indicates that the elements of these photographs can be identified in a group, which when considered together, differ from the other photographs. These dimensions are: a high degree of naturalism, the presence of water, a lack of development and three different land forms. Consequently, in areas of the RDA where characteristics which are typical of these dimensions are present, an effort should be made to preserve that scenery. Figure 6.2 indicates areas of the RDA where this scenery can be found an they have been labeled 'Areas of Scenic Preservation'.

FIGURE 6.1

Areas to Remain under Present Legislation

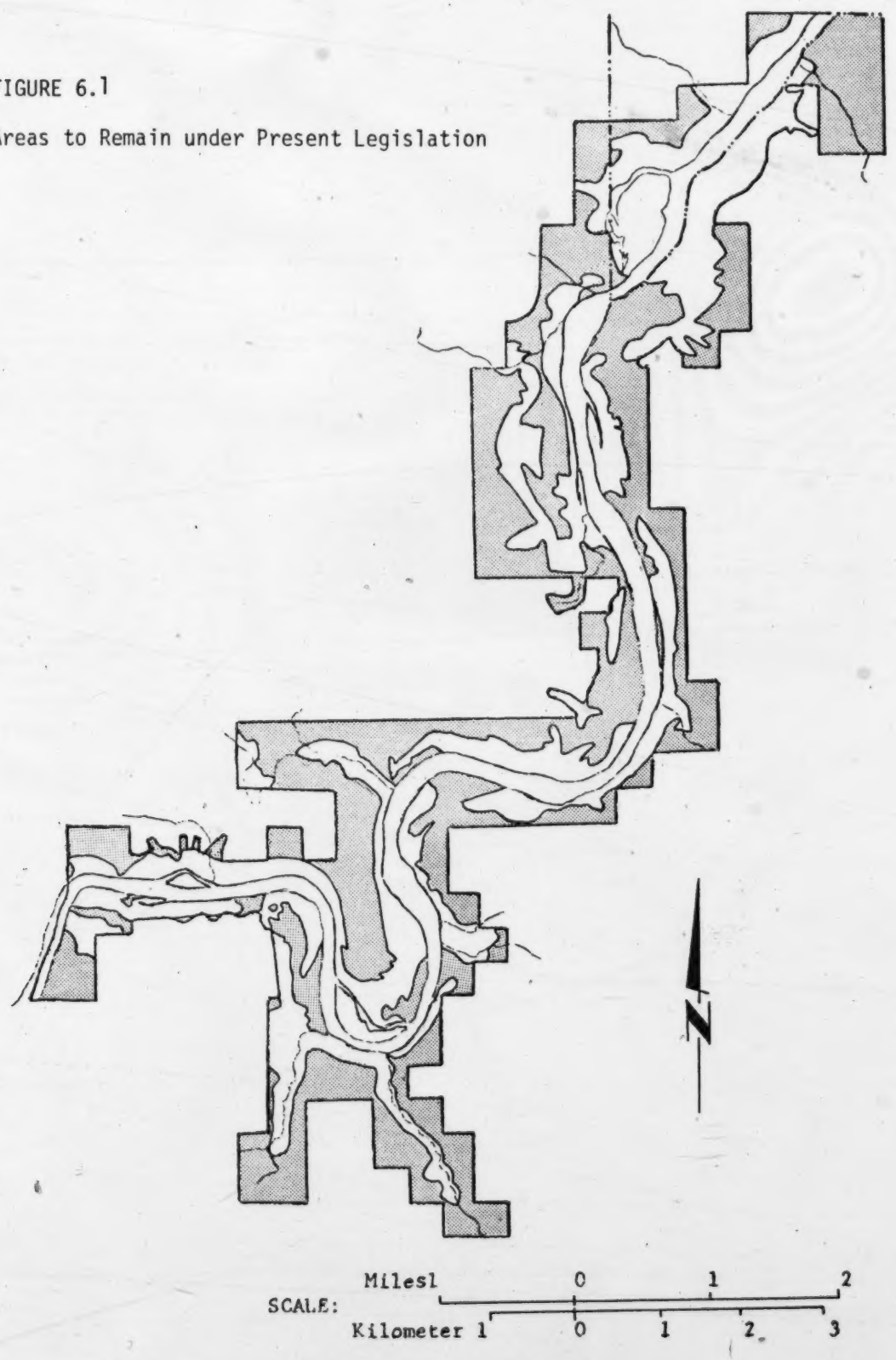
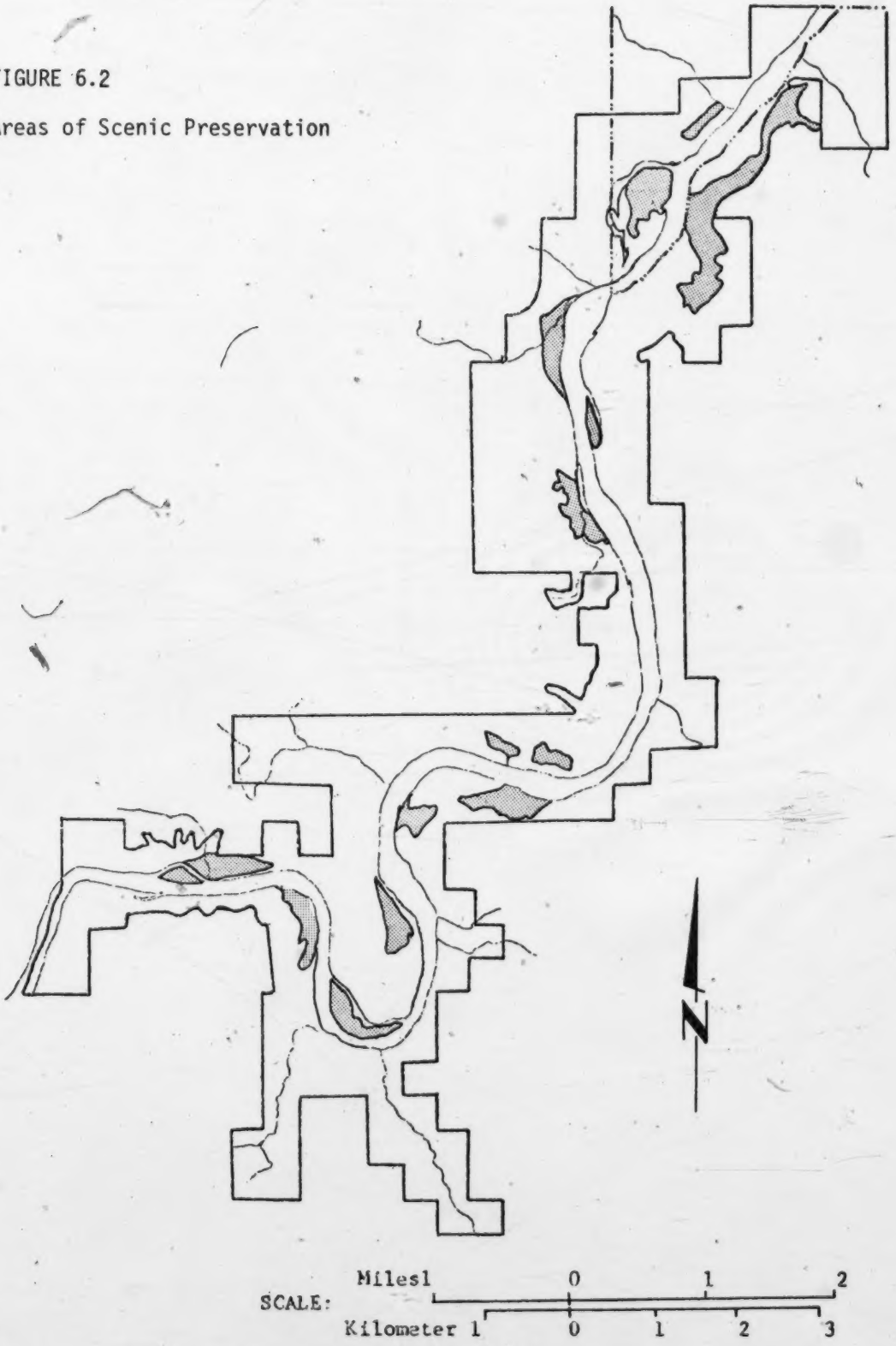


FIGURE 6.2

Areas of Scenic Preservation



b) Areas where Scenic Improvements are Encouraged

The least preferred photographs in this study are scenes one, four and six. From Table 6.1, viewer position and naturalism are easily grouped. The naturalism index is low, viewer position is normal. Less obvious, but quite able to be grouped together are the land uses. Water is absent and development is obvious. Trees in photographs one and six are an insignificant part of the scene, and in the least preferred photographs, pasture is the agricultural use. In areas of the RDA where these characteristics are typical, scenic improvement is needed. Figure 6.3 locates areas within the RDA where enhancement is needed and they have been labeled 'Areas where Scenic Improvements are Encouraged'.

c) Areas of Scenic Protection

Landscape dimensions of the next group should be scenically protected. The landscape dimensions of this group have been taken from the photographs with a "medium" level of preference: photographs two, three, eight, nine and ten. For the most part, the naturalism index of these photographs is also medium, as the influence of man is somewhat noticeable. No combination of landforms is particularly identifiable, and although a considerable number of trees can be identified in the land use category and on the photographs, as being common to these scenes, the presence of man seems to be the overriding feature. That is, the influence of man increases, and the naturalism index lowers, along with scenic preference. Figure 6.4 identifies 'Areas of Scenic Protection'.

FIGURE 6.3

Areas where Scenic Improvements are Encouraged

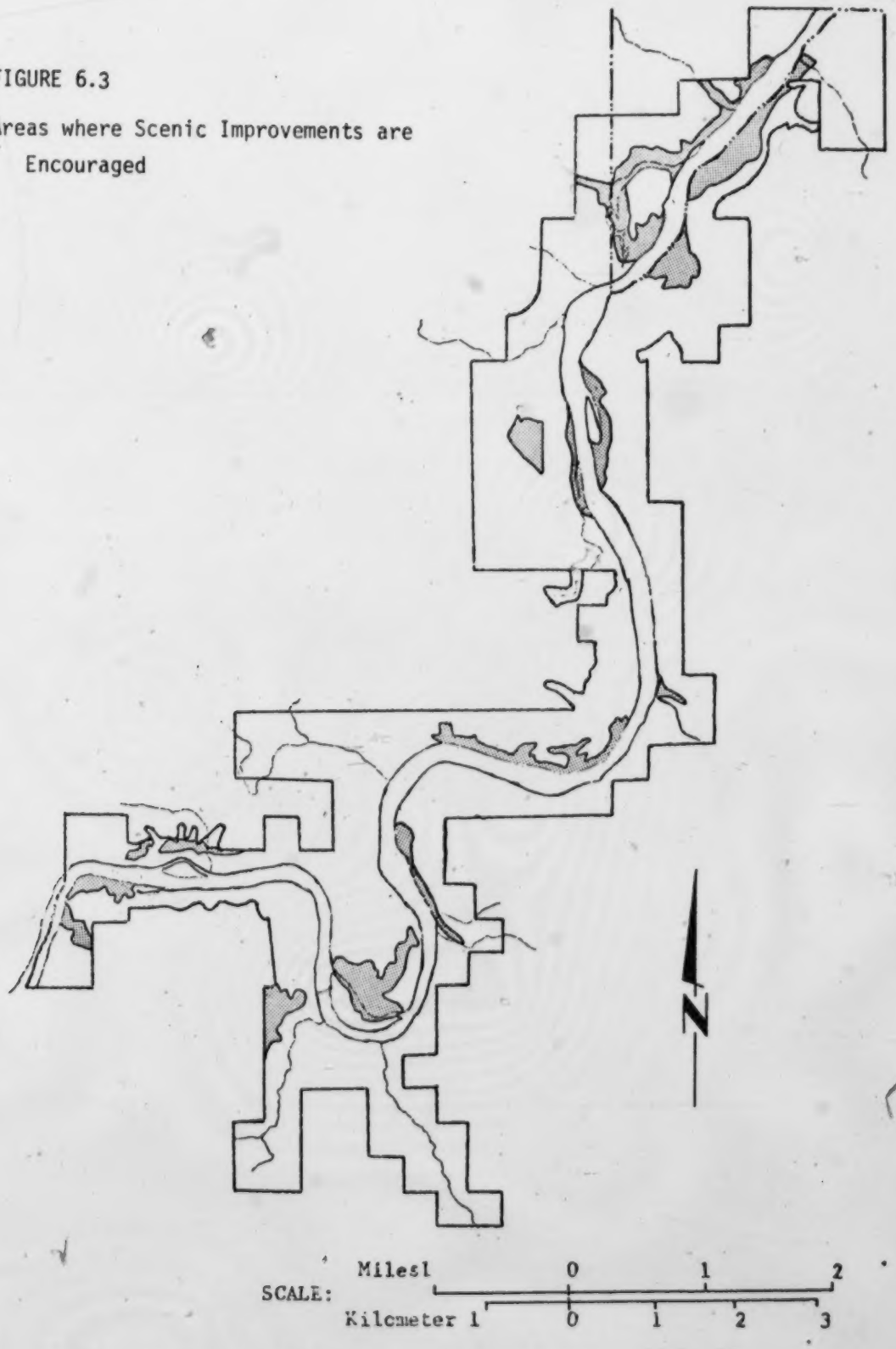
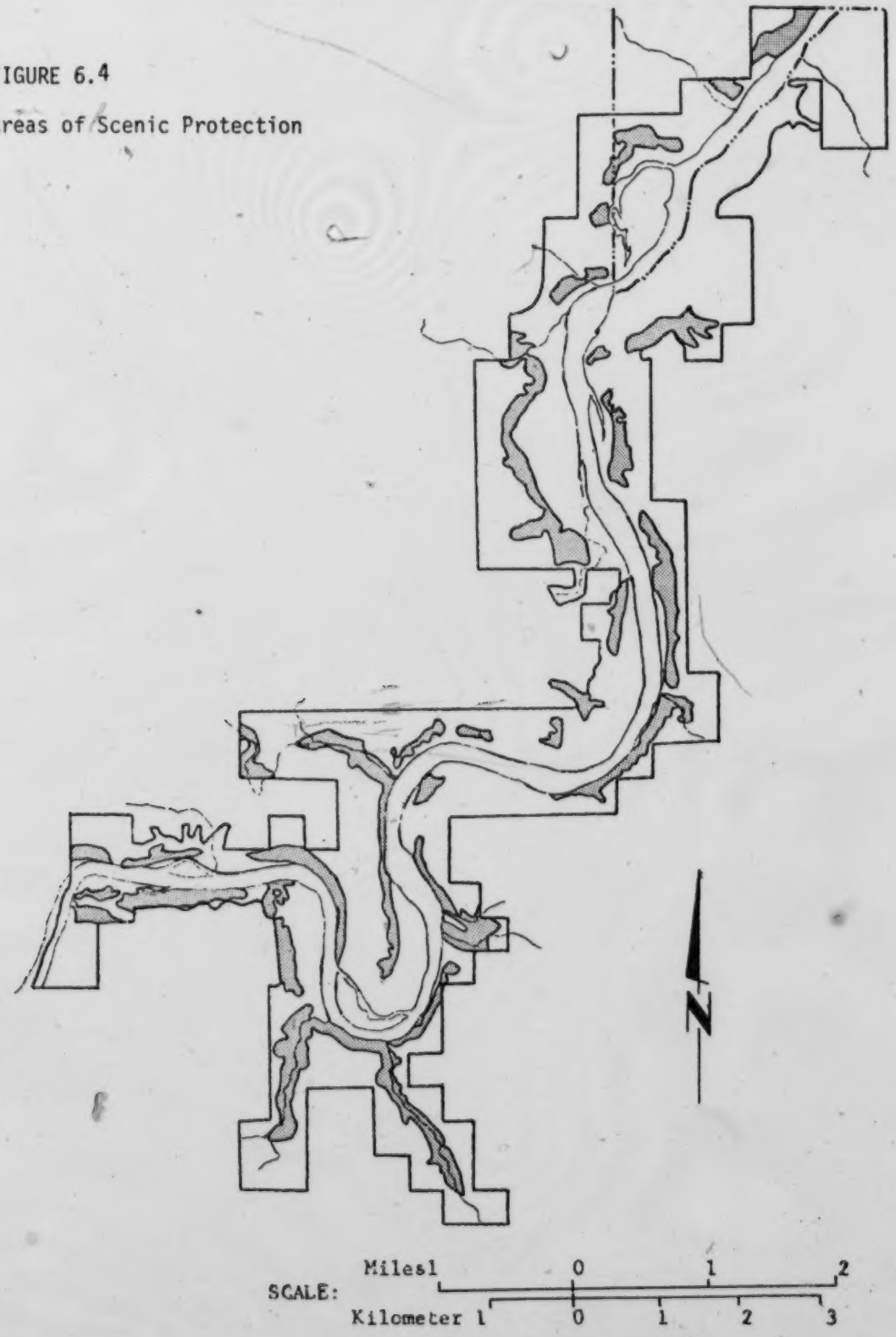


FIGURE 6.4

Areas of Scenic Protection



This procedure has enabled the total undeveloped and marginally developed lands of the RDA to be located and recommendations have been made based on scenic preference. Scenic preservation practices have been suggested for areas where highly preferred elements can be identified. Also practices of scenic protection, or improvements can be encouraged in areas where lesser preferred elements were identified.

D. Acceptable and Unacceptable Activities and Land Uses

There is more than one meaning for "attractive". The first part of this chapter has been concerned with one meaning: how to keep the area as scenically attractive as possible. Another meaning arouses interest or pleasure. The remainder of this chapter will be concerned with the second meaning.

More than ninety percent (91.5%) of the sample participated in this part of the questionnaire and would find the RDA attractive if a number of facilities were allowed and others restricted. To integrate the first and second parts of this chapter, the following discussion is concerned only with areas other than those already designated scenic preservation or scenic protection. The following recommendations and the previous scenic suggestions can be considered to be consistent with one another because both sets of suggestions are based on information received from the same people.

The sample was asked what activities they would allow or not allow in the Area, and the data to follow, results from the total of their first

five responses to each question. Tables 6.2 and 6.3 summarize these data.

In essence, then, this part of the chapter is concerned less with improving the scenery, and more with changing an unwanted scene into a more (acceptable and) attractive area.

E. Integrating Allowable and Restricted Activities with Areas of Preference

From Tables 6.2 and 6.3 it is evident that more than half (54.8%) of the sample would allow limited day-use recreational parks with shelters and playgrounds, and almost as many (51.9%) would not allow industry, manufacturing and oil refining in the Area. In the allowable recreational park, 46.9% would permit non-power boating, canoeing and kayaking and 38.9% would not allow any motor sports at all. Some motorized vehicles specifically mentioned as not allowable were: motor boats (and water skiing), all terrain vehicles, motor bikes, snowmobiles and dune buggies.

A number of sporting activities would make the restricted development area an attractive place to be: 44.1% would allow primitive camping; 38.4%, hiking; 28.2%, cross country skiing and snowshoeing; and 25.4% general sports. On the other hand a smaller percentage, 21.5%, would not allow large commercial sporting and tourist facilities; 7.9% would not allow intensive camping or picnicing, for example, campers and cottages, and 2.8% would not allow any summer or winter sports.

About a fifth of the sample (20.3%) would allow nature and game

TABLE 6.2

Activities and Land Uses Judged Allowable in the RDA

Ranked Order	Description	n	%
1	Limited day-use recreational parks with shelters and playgrounds	97	54.8
2	Canoeing, kayaking, boating (non-power)	83	46.9
3	Controlled primitive camping	78	44.1
4	Hiking	68	38.4
5	Cross-country skiing, snowshoeing	50	28.2
6	Golf, jogging, tennis, cycling - General Sports	45	25.4
7	Natural preserves with game preserve, nature studies, wilderness trails	36	20.3
8	Hunting and fishing	18	10.1
9	Farming	17	9.6
10	Planned semi-urban residential housing	17	9.6
11	Horseback riding	13	7.3
12	Acreages	5	2.8
13	Highways and bridges	2	1.1
14	Light industry	1	0.6
15	None/no response	15	8.5

TABLE 6.3

Activities and Land Uses Judged Not Allowable in the RDA

Ranked Order	Description	n	%
1	Industry or manufacturing or oil refining	92	51.9
2	Motor sports of any type - A.T.V., bikes, snowmobiles, etc.	69	38.9
3	Controlled urban development, apartment buildings, trailer parks	60	33.9
4	Commercial activities - tourist facilities, ski developments	38	21.5
5	River changes - dams, wiers, dredging, land clearing	25	14.1
6	Hunting	16	9.0
7	Resource extraction - gravel	15	8.5
8	Cottages, overnight camping, campers, major picnics	14	7.9
9	Sewage, garbage, noise - polluting activities	12	6.8
10	Paved roads, freeways, etc., motorized traffic	10	5.6
11	Acreages or agriculture	6	3.4
12	Sports - horses, boating, swimming - winter or summer	5	2.8
13	None/no response	15	8.5

preserves, but half as many (10.1%) would allow hunting and fishing. From Table 6.2, only 9% would not allow hunting.

This information regarding allowable and prohibitive activities must now be integrated with the information regarding scenic preference. Figure 6.2 indicates areas that have unique visual resources for the RDA and should be preserved for the enjoyment of all. This area is such a small proportion of the whole RDA that only the most restrictive uses can be justified - nature and game preserves with (perhaps) wilderness trails.

Figure 6.3 identifies the areas where scenic improvements are encouraged. Again this is a very small proportion of the whole area, and (by chance) some of the largest subareas border on areas of preservation. To make these large subareas more attractive to the respondents, improvements could take the form of limited day-use recreational parks with shelters, playgrounds, non-power boat launches, jogging and cycling paths, tennis courts and some access roads, and this would be acceptable to a large portion of the sample. In Edmonton an effort is now being made to provide this type of facility, for example, Hawrelak Park, which is part of the larger Capital City Recreational Park.

Landscape elements that must be protected to stop further 'landscape erosion' occupy those areas located in Figure 6.4. Those areas on the whole are the remaining undeveloped natural woodlands that occupy steep slopes, which if cleared would cause serious soil erosion. Other areas of protection are the rugged cliffs adjacent to the river. In the first

areas hiking, controlled primitive camping, cross country skiing and snow-shoeing and similar activities could be allowed. The other landscape feature, rugged cliffs, might be used for climbing exercises, but should remain as much as possible in its present state.

The remaining area of the RDA is shown in Figure 6.1 and is almost all developed into agriculture, recreation or residential. It is also the largest proportion of the RDA. There is ample room here to allow some sports, for instance, horseback riding or golf (of which there are already three courses) and some agriculture, for example, community pastures. But motor sports, industry and resource extraction, commercial activities and controlled development, which are now placing pressure on the edges of the RDA and the decision-makers, should be restricted.

F. Conclusions

This chapter has provided four maps indicating recognizable levels of scenic preference and has made suggestions as to what activities are and are not acceptable to the sample in the RDA. This information is valuable in a comprehensive plan of the Area because it is most practical to build visual considerations into the design rather than try to make corrections afterwards.

CHAPTER SEVEN

CONCLUSIONS

A. Introduction

This chapter reiterates, appraises and discusses the principal points of this thesis. First, the findings are summarized, which review the objectives of the thesis and include some interesting unconfirmed relationships. Secondly, general comments regarding the method used in this thesis are made, followed by specific comments on the use of photographic slides and on particular parts of the questionnaire. Thirdly, implications of these earlier comments are discussed and finally, a number of possible directions for future studies are given.

B. Summary of Findings

a) Consistency of Evaluations

(i) Evaluation of Photographic Slides

After the mean score of each photograph was calculated and the photographs ranked by preference, a large part of the analysis chapter was devoted to determining whether the mean represented the whole sample. To do this the sample was divided into a number of subgroups according to sex, amount of reading, faculty and class. The photograph evaluations of all parts of these subgroups were then compared to each other. From

this comparison, no differences were found to be greater than 1.0. Zube had already determined that subgroup evaluations are consistent if the differences are less than one (other studies have agreed). With every subgroup having similar evaluations it was assumed that the overall mean score was an accurate measure of preference, and the scenes ranked according to means represented the sample's scenic landscape preference in the RDA.

To identify the different scenic elements of particular levels of landscape preference, for this sample, the ranked photographs were divided into three groups. These three groups of high, medium and low ranked photographs were compared by various characteristics: land forms, land uses, naturalism and viewer position. By arraying these factors in a matrix (see Table 6.1) these characteristics are seen to group together into each level of preference. For example, in the group of photographs ranked highest there is a high degree of naturalism, the presence of water, a lack of development and three different land forms. In the group of scenes ranked lowest, water is absent, development is obvious, trees are sparse and agricultural land use is typically pasture. In the middle ranked scenes the influence of man is somewhat noticeable and seems to be the factor that explains the middle ranking.

(ii) Evaluation of Semantic Scales

The photograph mean was determined from calculating the eleven mean scale responses to each photograph by the whole sample. The second part of chapter five examined whether each photograph mean score represented the sample's scale responses. A similar comparison was performed as in

the photograph evaluation and similar conclusions drawn: the mean score of each photograph was representative of the sample's scale responses. The least preferred photograph (number six) had the greatest variation in scale responses and some differences were greater than 1.0, but from Figure 5.11 it can readily be seen that agreement of scale responses is nevertheless moderately high.

b) Surrogate for the Semantic Differential

It was suggested in chapter two that a test of the type used here could perhaps be shortened by simply asking a sample to rank photographic scenes between high scenic value and low scenic value. This was the last scale in each set of scales for each photograph. It was typewritten two spaces below the other scales and it was not randomized. This was done in an attempt to suggest, in a non-verbal way to the respondents, that this scale, although part of the full set, was different (see appendix). To test initial suggestion the overall photograph ranking was compared to the photograph ranking of this scale alone. It was found to be an inadequate surrogate for the semantic differential.

The inadequacy of this surrogate was noted at the $\alpha = 0.05$ level, which is a commonly accepted level in social science research. In other words if one scale and ten scales were used a hundred times to obtain preference rankings of the same scene, and if more than five of the complete rankings were different, then the one scale would be unacceptable as a measure to replace the full set of scales. However when tested at the $\alpha = 0.10$ level, one scale was found to be a reasonable surrogate, that is,

from the analysis it is expected that ninety times in a hundred one scale would determine preference rankings as effectively as the full set. This means, for a superficial appraisal, one scale could act as an indicator of scenic preference. This therefore means that by using one scale to test photographs a large number can be considered and a wide range of preferences can quickly be obtained without a study becoming tedious. In fact one hundred and ten scenes and one scale would be as long as the ten scenes and eleven scales of this study.

c) Scenic Landscape Preference Maps

Once the scenes were ranked according to scenic preference, the visual landscape elements of each photograph that were represented in the scene were identified. Landscape dimensions were recognized as belonging to different levels of preference (high, medium and low) from the matrix: Table 6.1. These grouped characteristics were then located on a map of the RDA by combining the physical information from chapter three with the assessment data of chapter five.

The landscape characteristics of the most preferred photographs were easily identified from the matrix and these elements were located on a map, see Figure 6.2. These few small areas should be saved in the present condition because they were found to be the most attractive in the Area. The next easiest identifiable group of landscape elements were characteristic of the least preferred photographs. The landscape dimensions characteristic of these scenes were also identified on a map (see Figure 6.3). Because these areas were found to be least preferred scenically in the Area, some

consideration can be given to scenically improving these areas and the map was therefore titled "Areas where Scenic Improvements are Encouraged".

Two other landscape preference maps were drawn. The first map located areas to be scenically protected. These areas contain landscape characteristics that are typical of the photographs which received a medium ranking. The second map includes all the area of the RDA that is not included in the first three maps. This area is already developed, and rather than encourage changes to the area that would enhance the scenery, it is suggested here that this area remain under the present RDA legislation.

d) What to do in Unattractive Areas

In an attempt to determine how areas of low scenic preference might be altered the sample was asked which activities or land uses are allowable or unallowable in the Area. It was found that the RDA could be made to be more attractive to the sample by allowing a number of recreational activities in the Area (see Table 6.2), and banning others (see Table 6.3), particularly industry, commercial and residential developments, and anything motorized.

e) Unsubstantiated Comparisons

A number of findings remain in the thesis that, although not tested, are interesting in themselves to note. Eight of the ten scenes were preferred more by females than males, which might suggest that females are aesthetically more sensitive than males. Seven of the ten scenes were

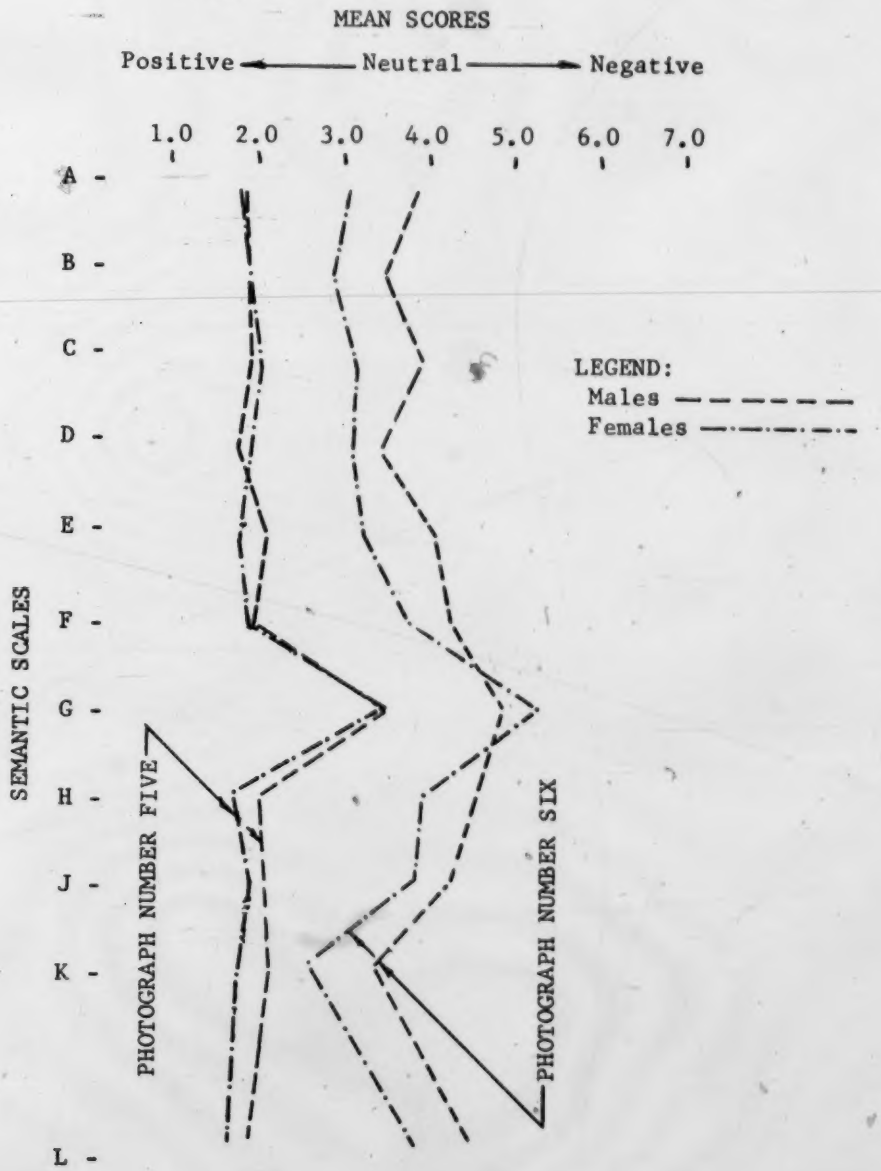
preferred more by above average readers, which supports the initial hypothesis that above average readers would be more sensitive to natural landscape scenes. And finally, foresters as a class and as a faculty (Forestry - Agriculture) tended to score the scenes more neutral than the others. As mentioned earlier, this last finding hints of a professional bias. If a bias is present it might suggest that those attributes, like specialized training, which qualify one for a profession, may prevent one from making unbiased scenic evaluations. Although these differences occurred, none were greater than 1.0 on any scale and considerable further work needs to be done in testing these hypotheses.

Moving from the overall photographic slide evaluations to the individual scale evaluations for each scene, perhaps the most important finding for future studies is the amount of variation, or lack of variation, found between the most and least preferred slides. This difference is readily seen when comparing male and female scale evaluations of photograph five and six. These two sets of evaluations, taken from Figure 5.9 and Figure 5.10 are shown together in Figure 7.1.

The difference in variation of scale evaluations evident in Figure 7.1 combined with the overall photograph evaluation (Table 5.4) suggests two things. First, in highly preferred scenes there are only slight differences in scale evaluation, and second, in scenes with a neutral evaluation, that is neither preferred nor disliked, there is considerable variation in scale evaluations. This notable difference in scale responses between highest and lowest ranked scenes will be further discussed in the final section of

FIGURE 7.1

Graphic Representation of Scale Assessment of Photograph Five and Six by Sex of Respondent



this chapter.

C. Comments on Technique

The comments of this section will be of two types: overall general comments concerning the technique and specific comments concerning particular questions of the questionnaire.

a) General Comments

The technique used in this thesis was the administration of a questionnaire to a sample population. This was done to determine scenic preferences. The questionnaire was designed with two concerns. First, questions were asked about representative landscape scenes of an area and secondly, questions were asked about the respondents that were believed to be associated with levels of landscape preference. Since photographs have been shown to accurately represent the landscape (chapter two) further comment here would be repetitive. Also the questionnaire survey has generally been accepted for many years as a means of collecting information from groups of people, and in this study it was found to be effective.

In any study of this type, the questionnaire can be administered to the whole population or to a sample. Since it is virtually impossible to test everyone, a sample is generally selected. In this study, not only was a small part of the whole population sampled, but a number of controls added an amount of compromise to the real world. Previous research indicated that age and past experiences could influence preferences. Previous

research has also indicated that the type of education one receives and the amount of reading one does (particularly magazines) may also influence preferences. In this thesis age was somewhat regulated by testing only third and fourth year university students. This procedure also controlled to a degree the past experiences of the respondents. Third and fourth year university students presumably read an amount that is more than the average for the public and the attempted control here was a subjective assessment. Type of education was controlled in two ways. First the sample was from more than just one discipline, for example, more than only those accustomed to making aesthetic decisions. Secondly the sample had a range of educational experiences that was between technical and aesthetic, also involving some disciplines customarily involved in scenic assessments. The implication of choosing a relatively homogenous sample of university students is inevitably that further research is needed, especially if public participation is a goal. Other implications will be discussed in the next section.

Scenic preferences were determined by analyzing the results of the semantic differential. This is a popular test for many researchers of scenic preference and for many reasons, particularly the ease with which the respondents understand the procedure. This was certainly the case for this sample. The semantic differential proved to be an effective and efficient means of assessing scenic preferences and as mentioned earlier seems to be more accurate than simple ranking techniques.

b) Specific Comments

The remainder of this section will identify a number of problems with the technique used here and provide some guidelines for others who might engage in future studies in the scenic preference field. There are two areas: first, the photographs, and secondly, the questionnaire.

The selection of the photographic slides used in this type of survey is critical. They must be representative of the area but not too many in number so as to avoid boredom, nor too few to be adequate. As far as possible, they must be similar in quality and no scene should have a large amount of ephemeral characteristics like sunsets or other different lighting to enhance a scene, nor hail damage, for instance, to decrease the quality of a scene. In this thesis a considerable number of preliminary selections, including a pilot test, resulted in the use of ten colour photographic slides in the main investigation. Ten were used because the respondents' attention span in the pilot was observed to wander after about ten minutes of slide presentation. After ten minutes the semantic differential was poorly answered.

The ten slides were taken in the summer and all between 9:00 a.m. and 3:00 p.m. The time of year is a compromise from having a much larger test involving all seasonal variations, as well as a study that would take a year to set up. However, it was found that the selection of season and time did conform to the suggestions of Kreimer (1977) which were published after this test was completed.

People who were raised in different parts of the country (or world), or who have lived in many areas, have different past visual experiences. It was therefore assumed that people of Edmonton and those who moved here from other parts of the country (or world) would have different scenic preferences. Questions eight to eleven were developed from this assumption. Question eight asked the respondent to indicate how many years he had lived in the city, suburbs or the country; question nine asked how long he lived within twenty miles of Edmonton. Question ten asked what regions they were most familiar with, if they had recently moved to Edmonton, and question eleven attempted to establish how mobile a person was. The answers to these questions were not used in the analysis because of a generally poor response and the inconsistency between answers to questions six, age, and question eight. Future studies which assume that past visual experiences, brought about by living in different parts of the country (or world), would affect scenic preferences would need better wording of these questions to obtain clear answers.

Question number thirteen - "Indicate the type of reading you usually do and the amount" - was criticized by some of the respondents after returning the questionnaire, as being difficult to answer because of too few choices. This question in the pilot had five different amounts of reading to choose between and was also criticized as being difficult to answer. It was then that the choices were condensed to three for the final investigation. Perhaps a seven step scale would be used here with "daily" and "not at all" as anchor words, so the respondents would have little or

no difficulty. This might also act as a good preview to the semantic differential.

Question nineteen - "Do you think NATURAL areas make a positive contribution to life?" - was later realized to be a "motherhood issue" and is therefore not important to ask. Almost all the sample believed that natural areas made a positive contribution to life, and it is therefore believed that much of the public would have similar beliefs.

Questions twenty-two and twenty-three are poorly worded for this study. They ask which activities or land uses would be allowable (or not allowable) in the area shown on the map. For a scenic assessment, which this study is, the questions should have asked, what should be done (or not done) to enhance the beauty of the area shown on the map. In answering the original questions the respondents strongly indicated that the area could be made more attractive if certain activities were allowed and other activities banned. This in itself opens an interesting direction of study. For instance, why were all the suggestions directed at recreational facilities and no suggestions made regarding the scenery? Perhaps because this was not specifically asked. But because these two questions were asked, recommendations made in this thesis subsequently needed to be development oriented. It would have been more acceptable to make suggestions as to how to scenically improve areas of low preference.

These questions (twenty-two and twenty-three) did, however, indicate the sample's collective environmental disposition. That is, the way the

respondents answered these questions did indicate the way in which they thought about (and related to) the everyday physical landscape. This finding could be significant in the planning of future uses of not only this RDA but others.

If this thesis is to make a contribution to the field of scenic assessments, then the comments made above must be considered. First, the semantic differential is an effective way of determining the direction and intensity of people's scenic preferences and second, photographs are an effective measure of the real landscape. Third, in areas where seasonal variations occur, consideration should be given to these variations. Fourth, the questionnaire should be long enough to allow the respondent to feel he is making a meaningful contribution, but also sufficiently short that he will not become bored or consider the questions meaningless. Perhaps more importantly, if a choice is included in a question, it must be able to be made quickly and with ease. And finally, if suggestions are to be made regarding acceptable scenic enhancement techniques, that information must be precisely asked of the sample.

D. Implications

This section will contain two types of implications, those for procedure and implications for the findings.

Because a relatively homogenous sample was tested, the understanding of public landscape preference patterns gained has been incomplete because

of the controls in the sample selection. The sampling method did, however, result in a considerable saving of time, effort and cost, and also provided data which are believed to be reliable for a very small stratum of the whole population. To obtain a complete understanding of public landscape preference patterns other strata of the population must be similarly tested.

Another reason for an incomplete understanding of preferences is that only one season was considered. In areas where a major characteristic is seasonal variation, for example, central Alberta, it cannot be omitted. This thesis has therefore mapped areas of scenic preference of the Edmonton - Devon RDA for the summer season.

A number of implications arise from the findings presented earlier. First there are the implications that arise if a study of this kind is to be repeated. Secondly there are the implications that arise because of what this thesis found. Implications of the first type on the whole have been discussed earlier. Photographs adequately represent the landscape. The inclusion of seasonal variation in the photographs is discussed above. The semantic differential is an effective method of measuring scenic preference and is better than a simple ranking technique. Some of the questions in this thesis must be reworded so that accurate results may be obtained: questions eight to eleven and questions twenty-two and twenty-three in particular. Other questions should be expanded, especially question thirteen about reading habits. Other questions should be dropped, specifically question number nineteen about natural areas.

Implications of the second type revolve around the fact that the sample's landscape preference pattern was readily obtained, identified and mapped. Therefore with the slight modifications mentioned earlier, and by sampling other strata of the population a more complete insight into the public's preference pattern could be gained. Finally the restricted development area was not only mapped as to scenic preference, but it was done so inexpensively. This means that the visual resources of the Edmonton - Devon RDA and other areas can be evaluated in a similar fashion and as inexpensively as other resources are evaluated, for example, water quality, slope stability, wildlife, and recreational potential. In terms of future RDA planning, visual resources can now be part of composite evaluations.

E. Future Studies

Research developed from this thesis can proceed in many directions. First and perhaps most obvious would be a similar study that looked at the variations in scenic evaluations and questioned "why" they occur. This study considered consistency of evaluation, within bounds that have already been defined in previous research, and asked, "what was preferred".

A second and perhaps more interesting direction would be to investigate why, when asked what activities and land uses are allowable in the Area, by far the majority of the answers involved "recreational activities". This would be a separate area of investigation to determine the general environmental disposition of the Edmonton public. The results of this type

of study would be most helpful to planners and other decision-makers who appropriate funds for the purpose of park construction.

Finally and perhaps the most interesting direction develops from the finding that scale evaluations vary between subgroups more for neutral scenes than for preferred scenes. The total sample's average preference for photograph six was indifferent ($\bar{x}$ = 3.95) but when the scoring of each scale was considered by subgroups, considerable variation was evident. On the other hand, the total sample's preference for photograph five was quite favourable ($\bar{x}$ = 2.14) and when the scoring for each scale was considered by subgroups, considerable agreement was evident. Keeping this pattern of agreement from neutral to positive in mind, it might then be safe to assume that a beautiful scene would enjoy almost total agreement in a scenic assessment. The obverse may be true: an unsightly scene might also experience almost total agreement in scenic evaluation. In review, then, there is likely to be little disagreement in evaluating beautiful or ugly scenes and from this study at least, considerable variation in assessments of ordinary everyday scenes.

To further develop the above idea it is helpful to borrow from Kates' (1962) explanation of variations in the perception and adoption of adjustments to floods. He claimed that there was a relationship between variations in flood frequency and variation in perception and adoption of adjustments. Similarly this thesis will make the claim that there is a relationship between variation in attractiveness and variation in evaluative judgments.

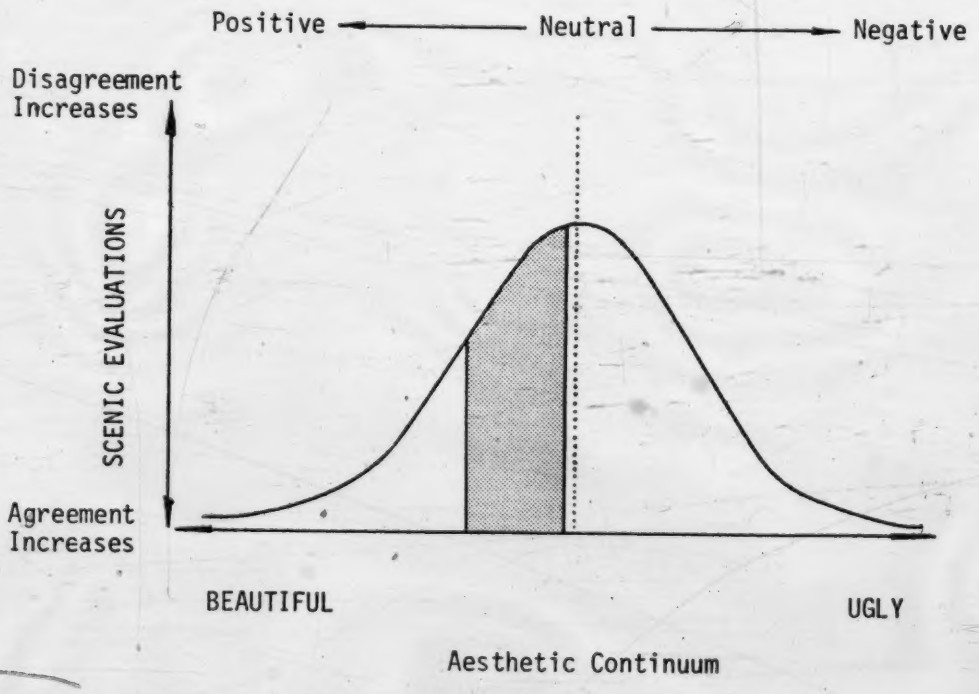
Briefly reviewing Kates, he claims that the relationship is described by a normal curve. On the x-axis, flood frequency per ten years is expressed on a logarithmic scale and the y-axis indicates variation in perception and adoption of adjustments. The curve is divided into three parts. At one end, where floods are very infrequent, that is, "negative certainty", there is little variation in the perception and adoption of adjustments to floods. Almost everyone did little about floods. At the other end, "positive certainty", again there was little variation in the perception and adoption of adjustments to floods; almost everyone did something about floods. In the middle of the curve, "uncertainty" (floods occurring but not often) variations in perception and adoption of adjustments to floods was high; some residents adopted a wide range of adjustments while others did little or nothing and were unaware of protective works.

Now in a similar fashion this study claims that the relationship between variation in attractiveness and variation in evaluative assessment is also described by a normal curve. On the x-axis attractiveness is expressed by an "aesthetic continuum" between beautiful and ugly. The y-axis indicates levels of agreement in scenic evaluations. The curve is divided into three parts: positive (beautiful scenery), neutral (everyday scenery), and negative (ugly scenery). At either end there is almost total agreement in scenic evaluations, and in the middle (neutral scenes) disagreement is high; that is, some like the scene while others dislike it.

This relationship can be seen in Figure 7.2. All the scenes used in this study were evaluated on the positive side of neutral and are also indicated on this diagram.

FIGURE 7.2

Aesthetic Continuum



An attempt to test the hypothesis that agreement in scenic evaluation is distributed normally around everyday scenes is perhaps one of the better ways to develop the scenic assessment field. This could be done by testing a wide range of scenes from the most attractive to the most unsightly, against a large sample. It might also be interesting to test those

individuals who live in areas that others have judged beautiful (or ugly).

In summation, this thesis represents a reasonably valuable attempt at mapping areas of scenic preference in the Edmonton - Devon Restricted Development Area. Although it only considered a small stratum of the total population, and therefore, in itself, is not the final visual assessment, it does offer some important implications for future studies, not only of restricted development areas but also for the whole field of scenic assessments of the natural landscape.

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APPENDIX

LANDSCAPE EVALUATION QUESTIONNAIRE

1) What faculty are you registered in? _____

2) What is your major subject? _____

3) Which year of university are you in? ☐ ☐ ☐ ☐ ☐
1st 2nd 3rd 4th 5th

4) In addition to your university, have you had any other education or training? Yes ☐ No ☐

5) If you answered "Yes" to question 4, please specify:

Trade ☐;☐☐ Years
Technology ☐;☐☐ Years
Armed Services ☐;☐☐ Years
Other _____;☐☐ Years

6) What is your age? _____ 7) What is your sex? _____

8) How many years have you lived in each of these settings?

Suburban _____ years; e.g. like Sherwood Park
Urban _____ years; i.e. within a city's boundary
Rural _____ years; i.e. town, village, or farm etc.

9) How long have you lived in or within twenty miles of Edmonton? _____ years

10) If you have recently moved to Edmonton, what are some regions outside of the city with which you are most familiar? _____

_____

_____

11) How often have you and/or your family made a major move or relocation? (i.e. between cities or countries)
(never) (once) (twice) etc. _____

12) Which philosophy were you taught as a child?

none ☐ Moslem ☐
atheism ☐ pantheism ☐
Christianity ☐ another: _____
Judaism ☐ _____

13) Indicate the type of reading you usually do and the amount:

TYPE	AMOUNT daily	monthly	not at all
School Material	☐	☐	☐
Newspapers	☐	☐	☐
Magazines	☐	☐	☐
Short Stories	☐	☐	☐
Novels	☐	☐	☐
Nonfiction Books	☐	☐	☐

14) Complete the following statement with any THREE of the ten words listed below :

" I believe a natural landscape scene represents..... "

Aesthetics ☐ Nature ☐
an Artifact ☐ a Place ☐
a Habitat ☐ a Problem ☐
History ☐ a System ☐
an Ideology ☐ Wealth ☐

●The purpose of this study is to measure the meanings that certain landscape scenes have on various people, by having them judge them against a series of descriptive adjective scales. In completing the series, please judge each landscape scene on the basis of your own feelings. On each page of this booklet you will find a set of adjectives. You are to rate each scene individually per series. i.e. for each scene use a new set of adjectives.

●Here is how you use the descriptive scales:

If you think that the landscape scene projected on the screen is <u>VERY CLOSELY RELATED</u> to one end of the scale, you should place your check-mark as follows:

Beautiful [X| | | | | | |] Ugly

or

Beautiful [| | | | | |X] Ugly

If you feel that a scene is <u>CLOSELY RELATED</u> to one or the other end of the scale (but not extremely), place a check-mark as follows:

Wet [|X| | | | |] Dry

or

Wet [| | | | |X|] Dry

If the scene is <u>ONLY SLIGHTLY RELATED</u> to one side as opposed to the other side (but is not really neutral), then you should check as follows:

Empty [| |X| | | |] Full

or

Empty [| | | |X| |] Full

If you consider the scene to be <u>NEUTRAL</u> on the scale, both sides of the scale EQUALLY ASSOCIATED with the concept, or if the scale is completely irrelevant (unrelated to the scene) then you should place the check-mark in the middle:

Alive [| | |X| | |] Lifeless

●<u>IMPORTANT</u>: (1) Place your check-marks IN THE MIDDLE OF SPACES, not on the boundaries:

Private [|X| | | |X|] Public
THIS NOT THIS

(2) Do NOT omit any descriptive scales.

(3) NEVER put more than one check-mark on a single scale.

Beautiful [| | | | | | |] Ugly

Boring [| | | | | | |] Interesting

Pleasant [| | | | | | |] Unpleasant

Valuable [| | | | | | |] Worthless

Like [| | | | | | |] Dislike

Usual [| | | | | | |] Unusual

Alive [| | | | | | |] Lifeless

Natural [| | | | | | |] Artificial

Varied [| | | | | | |] Monotonous

Stimulating [| | | | | | |] Unstimulating

High Scenic Value [| | | | | | |] Low Scenic Value

Unpleasant	|||||||	Pleasant
Monotonous	|||||||	Varied
Unstimulating	|||||||	Stimulating
Artificial	|||||||	Natural
Dislike	|||||||	Like
Unusual	|||||||	Usual
Interesting	|||||||	Boring
Lifeless	|||||||	Alive
Ugly	|||||||	Beautiful
Worthless	|||||||	Valuable
Low Scenic Value	|||||||	High Scenic Value

16) Do you participate in outdoor recreation? (i.e. spending some of your leisure time in the outdoors enjoying yourself) Yes ☐ No ☐

17) If you answered "Yes" to question 16 please provide some recent examples and indicate whether you think them to be organized or informal; large or small groups; rural or urban.

_____

_____

_____

_____

18) Do you belong to any voluntary or professional associations concerned with the natural environment? (eg. Audubon Society Sierra Club, S.T.O.P., canoe &/or hiking clubs, etc.) ____

_____

_____

_____

19) Do you think that NATURAL areas make a positive contribution to life? Yes ☐ No ☐

20) For two years the Alberta Government has regulated development of the river valley between Edmonton and Devon. Has this action personally affected you? Yes ☐ No ☐

21) If you answered "Yes" to question 20 please explain : ____

_____

_____

_____

NOTE: The following questions will be concerned with the government's restricted development area between here and Devon. Please refer to the small sketch map if you are not familiar with this area. Map is on back cover.

22) Within the area shown on the map, what are some activities or land uses you would allow? _____

_____

_____

_____

_____

23) What are some activities or land uses you would not allow in this area? _____

_____

_____

_____

_____

24) Are there NATURAL areas between Edmonton and Devon you find attractive? Yes ☐ No ☐ Don't Know ☐

25) Can you provide some examples? _____

_____

_____

_____

26) Are there NATURAL areas between Edmonton and Devon you find unattractive? Yes ☐ No ☐ Don't Know ☐

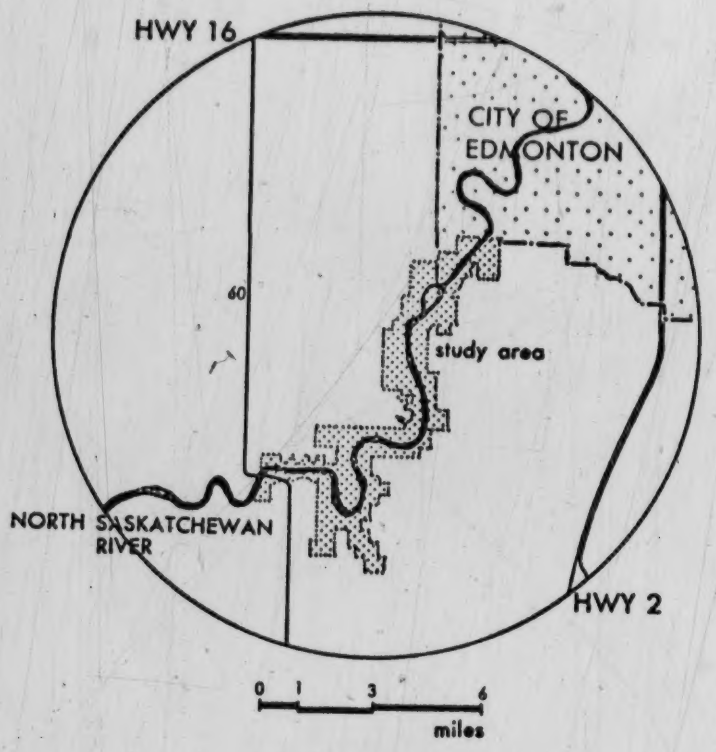
27) Can you provide some examples? _____

_____

_____

_____

THANK YOU



MAP OF STUDY AREA